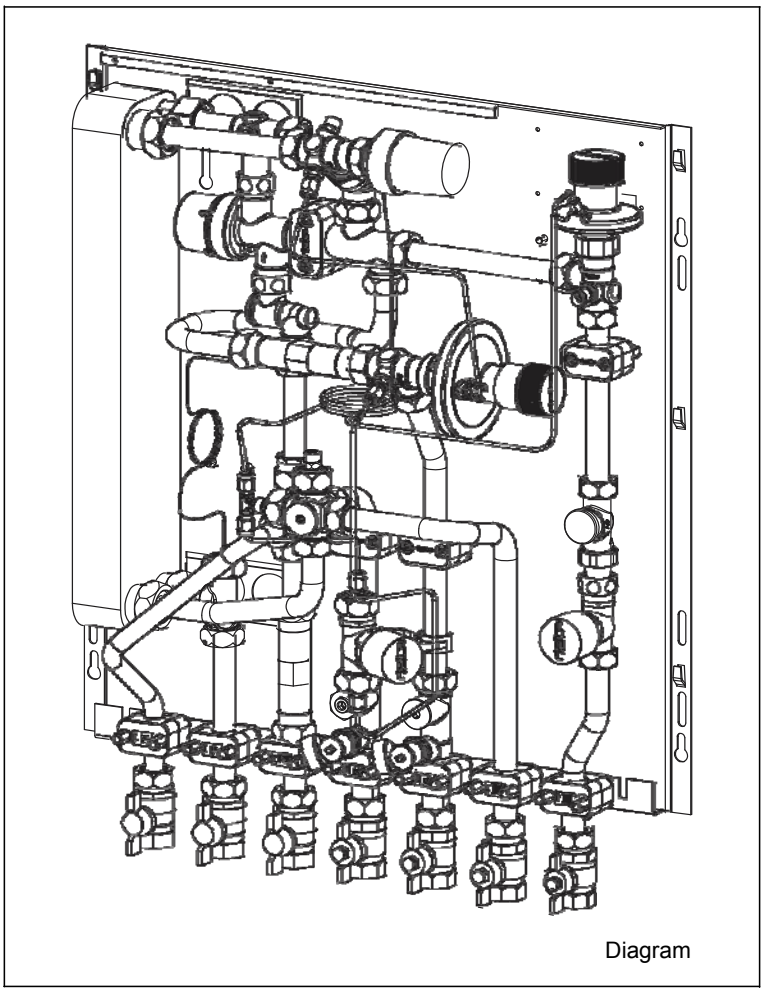
SERVICE MANUAL

Installation, Commissioning, Service and Maintenance

For the Technician



Diagram

Apartment unit

Version: 11/2011

WK wide/slim

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1 Important Information Regarding this Manual

This manual contains directions for the proper and secure installation, commissioning, service and maintenance of the WK Apartment unit and is intended solely for authorised technicians.

Follow these directions carefully to avoid danger and downtime and to increase the reliability and the service life of the Apartment unit

For proper and safe service and work performance of the Apartment unit, you must read and follow the information in this manual.

1.1 Validity of this Manual

This service manual is valid only for the WK Apartment unit built by KaMo Frischwarmwassersysteme GmbH.

The model is listed on the nameplate, which is located on the base of the Apartment unit.

The nameplate includes the following information:

- distribution
- manufacturer
- device type
- technical data
- build year
- serial number
- order number
- production location

Fig. 1.1 Nameplate (example)

1.2 Related Publications and Instructions

Other instructions shall be considered in addition to this service manual.

▶ Observe the information and notices in the product configuration.

The product configuration is included in the delivery of the Apartment unit. If it is not included, request a copy from your distribution partner.

▶ When servicing this unit, be sure to observe all instructions regarding accessories and components of the heating system.

▶ When servicing this unit, also observe:

- any recognised technical regulations for safe and proper work
- any legal regulations for accident prevention
- any legal regulations for environmental protection
- any regulations from trade associations
- any relevant safety conditions from DIN, EN, DVGW, DWGW, VDE or AGFW,
- any regulations that apply to other countries or the EU
- and any relevant requirements for the state of the art.

1.3 Safekeeping of the Documents

▶ Keep this manual and any other applicable documents in a safe place so that they are readily available.

▶ Give these documents to the operator.

1.4 Symbols Used

This document uses various markings and symbols throughout the text. These are explained below.

Symbol for helpful tips and information.

▶ Symbol for a required action or measure.

▷ Result or outcome of an action.

- Symbol for a list.

1. Numbered list

1 Numbered steps

`Display`

⇨ *Sec. Reference to a section*
⇨ *Fig. Reference to an illustration*
⇨ *Page Reference to a page*

The symbol shown to the left indicates a possible danger. Various symbols are used depending on the level of danger.

▶ Also observe the classification and basic structure of warnings. (⇨ *Sec. 2 "For Your Safety"*).

1.5 Abbreviations Used

The commonly used abbreviations in this document are listed below. Specialised abbreviations are found in the legends in the appropriate places.

Abbreviation	Meaning
AP	surface-mount (Aufputz)
BWZ	service water circulation (Brachwasserzirkulation)
DDR	differential pressure regulator (Differenzdruckregler)
i.e.	that is
ESPK	injection circuit (Einspritzkreis)
FBH	floor-heating (Fußbodenheizung)
HZ-RL-PR	primary heating return (Heizung-Rücklauf-Primär)
HZ-RL-SEK	secondary heating return (Heizung-Rücklauf-Sekundär)
HZ-VL-PR	primary heating supply (Heizung-Vorlauf-Primär)
HZ-VL-SEK	(secondary heating supply (Heizung-Vorlauf-Sekundär)
KGH	ball valve (Kugelhahn)
KWA	cold water outlet (Kaltwasserabgang)
MWS	modular home system (Modulares Wohnungssystem)
PM valve	proportional flow valve (Proportionalmengen-Regler)
RTB	return temperature limiter (Rücklauftemperaturbegrenzer)
SF	dirt trap (Schmutzfänger)
TTV	thermostatic temperature holding module (Thermostatisches Temperatur Vorhaltemodul)
TW	cold water/drinking water (Kaltwasser)
TW1	drinking water warming station 1 (Trinkwasser-Erwärmungs-Station 1)
TWR	thermostatic warm water regulator (Thermostatischer Warmwasserregler)
TWW	hot water (Warmwasser)
UP	flush-mount (Unterputz)
WK1S	home combo station 1 slim (Wohnungs-Kombi-Station 1 schmal)
WMZ	heat exchanger (Wärmemengenzähler)

2 For Your Safety

This manual contains instructions regarding safety. Follow all notices in order to avoid personal injury, environmental damage, or property damage.

2.1 Safety and Warning Notices

Basic warning notices include instructions to ensure the safe operation of the device or to maintain safe conditions.

Warnings that relate to actions warn you of residual hazards and are located before a dangerous action step.

2.2 Classification of Warning Notices

Warnings that relate to actions are ranked and marked with signal words according to the severity of the danger. The signal words used in the text are explained below with their corresponding warning symbol.

Warning Symbol	Signal Word	Explanation
	DANGER!	Immediate risk to life, serious or slight personal injury
	DANGER!	Risk to life through electric shock.
	CAUTION!	Risk of damage to property or to the environment.

2.3 Structure of Warnings

Warning notices are distinguished by dividing lines above and below them, as shown below:

SIGNAL WORD **Type of danger and source!**

Explanation of the type of danger and its source.

- ▶ Measures to prevent the danger.

2.4 Intended Usage

The Apartment unit is only intended to be used for hot water, regulation of downstream heating and consumption metering of heat and water for an apartment or a residential unit.

It is not intended for any other usage. Neither the manufacturer nor the supplier shall be responsible for any damages resulting from misuse of this equipment. The user assumes all responsibility for risks. The intended usage requires attention to all applicable documents and compliance with inspection and maintenance terms.

The values given in the technical data are to be strictly followed at all times.

2.5 Personnel and Qualifications

The Apartment unit is only to be operated by the operator or by other authorised personnel. Any service work (installation, commissioning or maintenance) requires specialised knowledge. Service work should only be performed by approved service companies.

Operator

The operator is responsible for the proper operation of the heating system. The operator must:

- have read and understood the service manual,
- be of at least minimum legal age to operate this equipment
- ensure that the heating system is regularly maintained by a heating engineer

Heating Engineer

The heating engineer is qualified to install and commission the unit and to perform maintenance and repair work.

Authorised heating engineers must have a training certificate or equivalent experience and will be responsible for any guidelines, rules and regulations.

Any work on electrical equipment may only be performed by electricians who are qualified according to electrotechnical regulations.

Work on hydraulic equipment may only be performed by persons who have specialised hydraulic knowledge and experience.

The engineer must have read and understood the service manual.

2.6 Installation, Commissioning and Maintenance

▶ For your safety, be sure that the installation, commissioning and maintenance of the Apartment unit is performed by a recognised service company with appropriately qualified personnel (⇨ *Sec. 2.5 "Personnel and Qualifications"*).

2.7 General Safety Notices

▶ For your safety and the protection of your surroundings, observe the following notices.

Risk of Electric Shock

Controllers and pumps are connected to electrical current. Components that carry voltage can cause death or serious injury if touched.

- Switch off the power before beginning work on electrical components.
- All work on electrical components is only to be performed by qualified electricians.
- Never allow wet or damp body parts to touch electrical components.
- Never pull on electrical wires or connections.

Avoid Risk of Burn or Scalding

The surface of individual parts and the water that runs through the taps can be very hot.

- Never touch hot surfaces.
- Carefully check the temperature of the water with a gauge before you touch it.

Leaks

If leaks occur, you must follow these instructions.

- Immediately close all shut-off valves.
- Fix the leak properly.

Avoid Frost Damage

The Apartment unit is not protected from frost damage without hot water and electrical power.

- Notify the operator, and be sure that the Apartment unit is in service during freezing weather and during periods of absence.
- Notify the operator, and be sure that the unit's installation location and the living space are maintained at a sufficient temperature.

Avoid Property Damage due to Improper Maintenance

- Perform annual maintenance on the Apartment unit, in consultation with the operator (⇨ *Sec. 9 "Maintenance"*).

Notices Affixed to this Unit

- Observe all notices that are affixed to this unit.
- Be sure that all affixed notices are completely legible at all times.

Avoid Property Damage Due to Incorrect Add-On Parts, Replacement Parts or Wear Parts

Unapproved components or replacement or wear parts that have not been tested with the system can damage the Apartment unit.

The installation of unapproved components or replacement or wear parts or unapproved changes are not in accordance with regulations and can affect the function, safety and warranty of the system. In such cases, we assume no responsibility.

- When replacing parts, only use KaMo Frischwarmwassersysteme GmbH original parts or KaMo Frischwarmwassersysteme GmbH approved replacement parts.

2.8 Operating Conditions

2.8.1 Operating Conditions for the Apartment unit

▶ Observe the following requirements and instructions to avoid damage to your Apartment unit.

Adverse operating conditions can damage the Apartment unit through corrosion or chemical or physical reactions.

▶ Notify the operator, and be sure that the installation location meets the following operating conditions.

- dry
- avoid high humidity (no laundry washers or dryers in the installation area)
- well-ventilated
- frost-protected
- ambient temperature: 0 °C to +50 °C
- do not use aerosol cans, spray solvents or paints, etc. in the installation location
- avoid large amounts of dust

2.8.2 Operating Conditions for the Plate Heat Exchanger

▶ Observe the following notices regarding:

- pollution
- and corrosion resistance of the soldered plate heat transformer with respect to substances in water.

Pollution

▶ Observe the following regulations:

- DIN, VDI and AGFW regulations for drinking and heating water
- as well as the GEA WTT regulations for substances in water (see Table ⇨ *Page 13*)

▶ Note that many different factors can affect fouling and pollution. For example, these include:

- flow rate
- temperature
- turbulence
- dispersion
- water quality

▶ Choose the media that has the highest possible mass flow.
(If the mass flow is too low, the turbulence can flow backward in the heat exchanger, increasing the tendency to pollute. Lime deposits can occur in heat exchangers when temperatures rise above 60°C, depending on water quality. Turbulent flow and low temperatures reduce the risk) of calcification.

Corrosion Resistance of Soldered Plate Heat Exchanger Regarding Substances in Water

The soldered plate heat exchanger is made of pressed stainless steel plates 1.4404 or SA240-316L.

- Bear in mind the corrosion behaviour of stainless steel and soldering agent copper or nickel.
- Also observe the product configuration.
- Adhere to the following values for substances in water and parameters.

GEA WTT Regulations for Substances in Water:

Substances in Water + Parameters	Unit	Plate Heat Exchanger, copper-soldered	Plate Heat Exchanger, nickel-soldered	Plate Heat Exchanger, screwed
pH Value		(with respect to SI Index)	6 - 10	Not stipulated for drinking water
Saturation index SI (delta pH value)		-0.2 < 0 < +0.2	Not stipulated	
Total hardness	°dH	6 - 15	6 - 15	
Conductivity	µS/cm	10...500	Not stipulated	
Filterable Substances	mg/l	<30	<30	
Chloride	mg/l	See Diagram (⇨ *Fig. 2.1*), above 100 °C no Chloride allowed		
Free Chlorine	mg/l	<0.5	<0.5	
Hydrogen sulphide (H2S)	mg/l	<0.05	Not stipulated	
Ammonia (NH3/NH4 +)	mg/l	<2	Not stipulated	
Sulphate	mg/l	<100	<300	
Hydrogen carbonate	mg/l	<300	Not stipulated	
Hydrogen carbonate/sulphate	mg/l	>1.0	Not stipulated	
Sulphide	mg/l	<1	<0.5	
Nitrate	mg/l	<100	Not stipulated	
Nitrite	mg/l	<0.1	Not stipulated	
Iron, dissolved	mg/l	<0.2	Not stipulated	
Manganese	mg/l	<0.1	Not stipulated	
Free carbonic acid	mg/l	<20	Not stipulated	

The values listed are standard values that may vary under certain conditions.

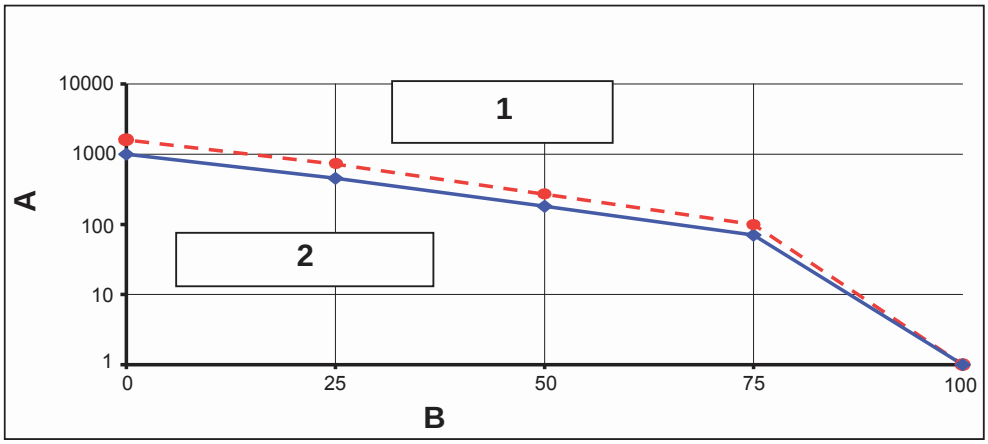


Fig. 2.1 Allowable chloride content depending on temperature (1.4404/SA240 316L)

(1) Not used
(2) Used without problem

A A Chloride content (mg/kg)
B B Temperature (°C)

Operating Conditions for the Screw-Fastened Plate Heat Exchanger

If screw-fastened plate heat exchangers (GGS240H-...) are used, special operating conditions must be observed.

▶ Observe the following value limits.
Temperature limits: -20 °C ... + 110 °C max
Max. operating pressure: 16 bar

2.9 Manufacturer's Declaration

The Apartment unit is built according to the state of the art and to recognised safety and technical standards.

Conformity with applicable standards has been verified.

3 Information Regarding Service Work

Service work entails the following:

- installation
- commissioning
- maintenance and inspection
- repair
- decommissioning

3.1 Basic Instructions for Service Work

The following information applies to all service work:

- Never use damaged parts.
- When removing parts, mark them so that they can be identified later by their installation location and position.
- Always store electrical components in a dry and dust-free environment.
- Install and isolate pipes according to the HeizAnIV (Heating Equipment Ordinance).
- Protect the pipe insulation against damage from outside.

3.2 Rules of Engineering

Service work must be performed according to site conditions, local regulations and rules of engineering.

3.3 Regulations

The following regulations apply to all service work:

- Observe all legal regulations concerning accident prevention.
- Observe all legal regulations concerning environmental protection.
- Observe all regulations from trade associations.
- Only use tools and resources (for example, hoists or ladders) that comply with the appropriate accident prevention regulations.

3.4 Required Tools

To perform any service work on the Apartment unit, you must have tools and gauges suitable for heating and climate control devices and for electrical installation.

4 Structure and Function

4.1 Structure of the Apartment unit

The illustration shown is a schematic diagram and does not represent every possible configuration. All information is subject to change. Also refer to the product configuration.

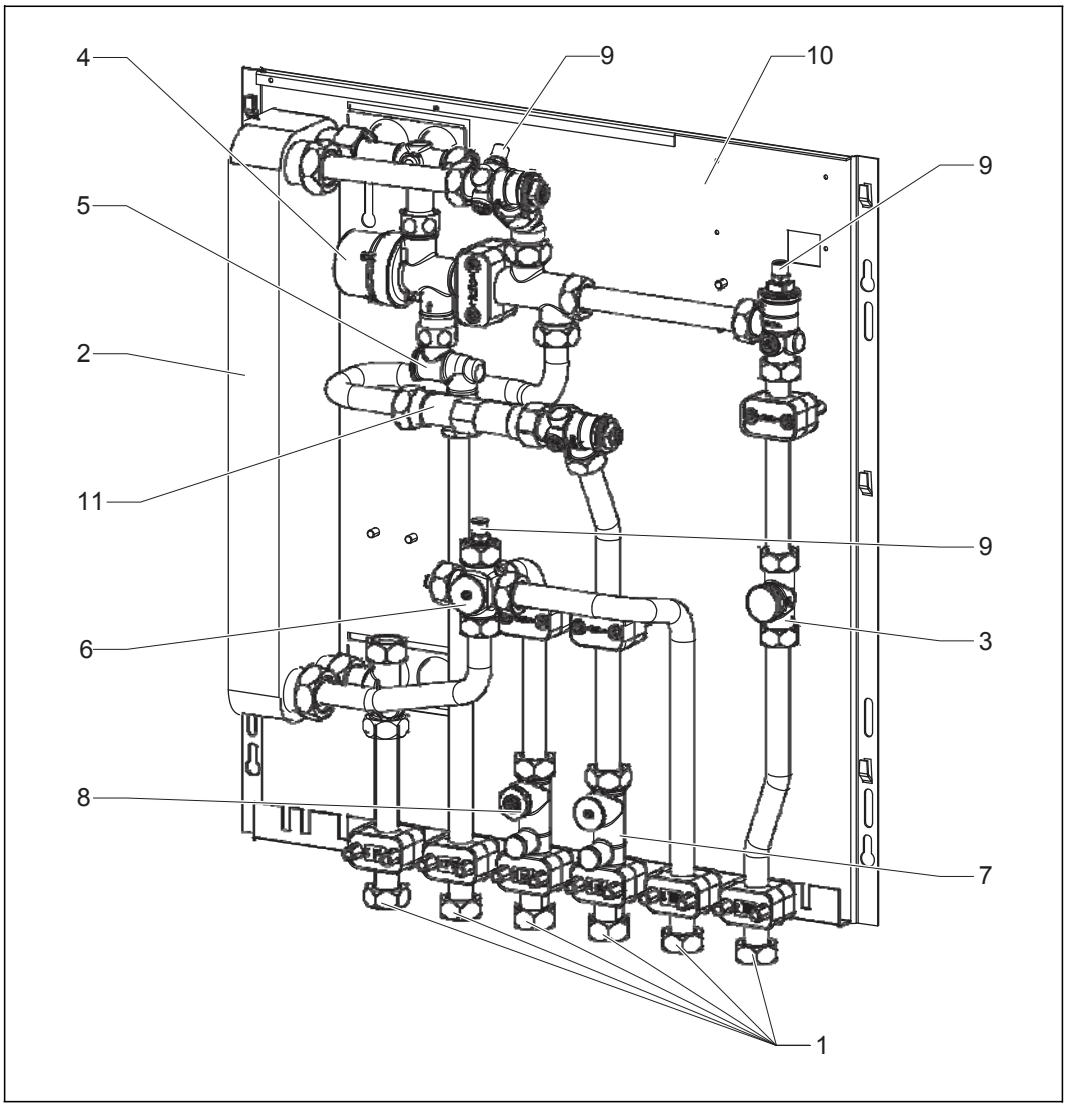


Fig. 4.1 Structure of the Apartment unit (WK wide) - Basic Configuration (schematic diagram)

(1) screw cap 3/4” female thread
(2) plate heat exchanger
(3) zone valve
(4) 3-way proportional flow valve
(5) dirt trap, cold water
(6) dirt trap, HZ-VL-PR
(7) double finger
(8) sensor screw connection for heat meter
(9) breather
(10) base plate
(11) heat meter adapter

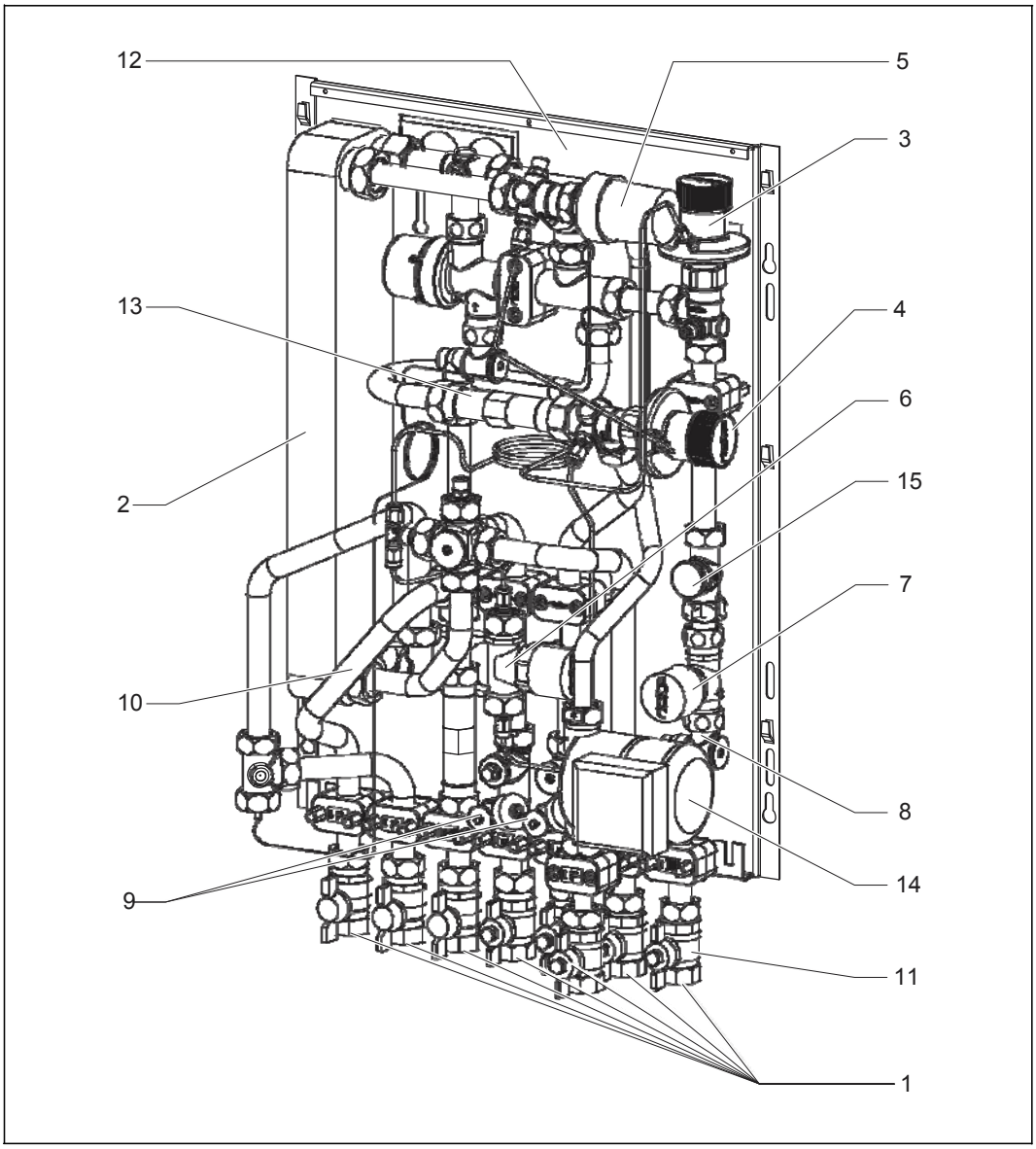


Fig. 4.2 Structure of the Apartment unit (WK narrow) - Complete Configuration (schematic diagram)

(1) screw cap 3/4” female threads
(2) plate heat exchanger
(3) differential pressure regulator in the home heating circuit
(4) differential pressure regulator in the station inlet
(5) TWR-Set
(6) TTV-Set
(7) RTB-Set
(8) dirt trap HZ-RL-SEK (optional)
(9) drainage set
(10) KW-home outlet with two meter fitting pieces
(11) ball valve
(12) base plate
(13) heat meter adapter
(14) service water circulation
(15) zone valve

4.2 Apartment unit Operation

4.2.1 WK Apartment unit Operation

The WK Apartment unit is a compact station and can be used in a multi-unit dwelling or as a supplement to an existing heating system. The Apartment unit is suited for a single housing unit and serves to measure and regulate the heating system and the supply of domestic hot water.

The Apartment unit combines:

- an instantaneous supply of domestic hot water through a plate heat exchanger (regulation of the hot water supply occurs without auxiliary power)
- the ability to meter energy usage for heating and hot water, as well as cold water volume (optional)
- the ability to regulate a home heating circuit

The equipment and features may vary. The basic Apartment unit unit is available in two widths, with varying configurations:

- slim base
- wide base

The Apartment unit is powered by a central heating plant. A central pump is sufficient for the Apartment unit to provide domestic hot water and heat.

Service water is automatically regulated through a pressure-controlled proportional flow valve (PM valve). The valve operates without auxiliary power. The proportional flow valve only opens if hot water is dispensed. When the hot water is shut off at the tap, the PM regulator closes, and the heat exchanger is no longer heated.

While the hot water is being prepared, the proportion of hot water volume to warm water volume (corresponding to the volume of cold water supplied) is regulated by the PM valve. This regulation assumes a constant and defined pressure ratio along the heating path. As long as the flow temperature and pressure ratio are constant, the correct temperature at the tap is roughly achieved by proportional volume adjustments for large or small tap flow rates.

The heat exchanger quickly cools to the ambient temperature whenever the hot water is shut off at the tap. In this way, the temperature of the heat exchanger does not remain above 50°C for unnecessarily long periods of time. This mode of operation helps to prevent calcification in the heat exchanger.

A throttle plate in the cold water inlet to the PM valve limits the flow of cold water to the target value. The Apartment unit prevents an excessive flow of water, which prevents a reduction in the hot water temperature. A cold water dirt trap helps to protect the PM valve and the throttle plate. In addition, a pre-trap in the primary circuit helps to protect the main unit. This serves to protect the unit from impurities in the primary network.

The Apartment unit is equipped with a manual release, allowing you to let air escape out of the main unit. However, the manual release does not bleed air from the entire heating system.

4.2.2 Description of Components

The Apartment unit is made up of various components. Some of these components are included in the basic configuration, but a few of the components listed here are optional in the basic unit. The exact configuration is available in your product configuration.

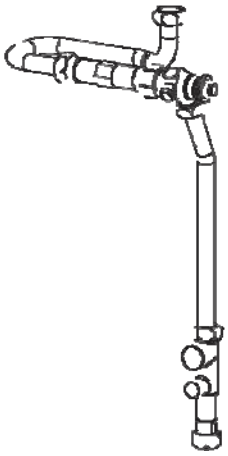
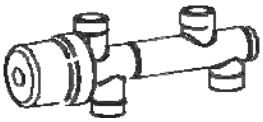
Illustration	Component	Description
	zone valve	The zone valve is a control valve with a Kvs function. With the control valve on the heating side, a hydraulic comparison of water flow in the Apartment unit's heating circuit can be performed. This allows a blend setting to take place without a stroke setting. An actuator may also be installed on the control valve, which can be regulated via a control.
	WMZ heat meter line	The heat meter line can accommodate a customer-supplied heat meter (110 mm x 3/4” male threads). A sensor pocket M10x1 is directly immersed to accommodate the flow sensor. On-site, use heat meters with Qn 1.5 and a very fast sampling rate (1.5 - 2 sec. flow rate measurement, every 3-4 seconds full measurement, i.e. kWh calculation). The heat meter serves to bill energy usage for heating and hot water preparation. This can be also be used to read the temperature and flow of the Apartment unit.
	PM valve proportional flow valve	A pressure-controlled proportional flow valve (PM valve) regulates the service water temperature. The PM valve provides quick switching of heating for hot water preparation. At the same time, the PM valve also maintains a ratio of hot and cold water as well as prioritizing hot water preparation over home heating. Heating water cannot flow through the PM valve into the drinking water system, and vice versa. The PM valve is approved by the DVGW (German Technical and Scientific Association for Gas and Water).
	plate heat exchanger	Stainless steel plate heat exchangers are built into the Apartment unit. The large thermal length of the heat exchanger allows for exceptionally good cooling of the heating water and therefore low return flow temperatures. The energy is supplied through the heating water with a flow temperature of at least 55°C for the heating water flow.
	cold water throttle	The cold water throttle is located in the screw connection between cold water connection to the PM valve and the cold water dirt trap. It is secured by means of a snap ring which can only be replaced by use of special pliers. The cold water throttle limits the cold water pressure to the heat exchanger. In doing so, the throttle plate limits the cold water volume, keeping the hot water supply from exceeding the calculated value. This means that the cold water cannot raise the heating side to the desired temperature.
	cold water dirt trap	The cold water dirt trap protects the cold water throttle and the PM valve from contaminants in the drinking water supply.
	dirt trap in primary flow line	The dirt trap in the primary flow line protects the unit from dirt in the supply line.

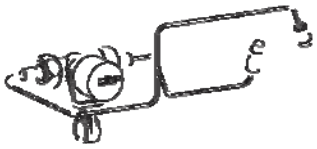
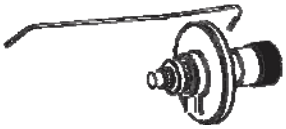
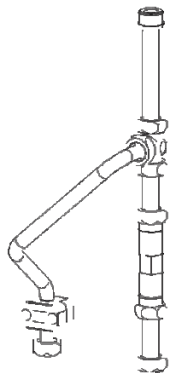
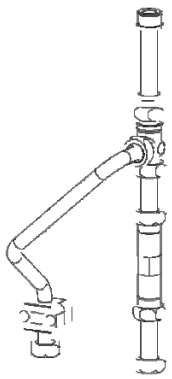
Illustration	Component	Description
	TWR thermostatic warm water regulator	The TWR can provide a stabile temperature at the tap, even if the primary flow temperature fluctuates. In cases of very high primary flow temperatures, the TWR is throttled according to the set value (hot water temperature) of the flow in the heating return. The return temperature in the device is kept low, providing scald protection. Every thermostat needs a reaction time of at least three seconds before it can be regulated precisely.
	TTV thermostatic temperature holding module	A TTV is installed in a Apartment unit or in the last device in a string of devices. It prevents the cooling of connector lines or feeders when the heat is switched off or during extended pauses at the tap. For up to five homes in a row (six after calibration), a TTV is required at the end. All homes that are more than 5m away from the line are to be fitted with a TTV. The TTV is omitted if a circulation is installed. (TTV is covered in the scope of delivery.)
	DDR differential pressure regulator, primary	The primary differential pressure regulator is used for the hydraulic balancing of the Apartment unit in the network. Every Apartment unit with a DDR is preset, protecting the heating and hot water service.
	DDR differential pressure regulator, secondary	The secondary differential pressure regulator is used for the hydraulic balancing of the home heating circuit. The differential pressure regulator is preset at the factory.
	KWA cold water home outlet with meter line (1 adapter)	A KWA with a home outlet makes it possible to measure the cold water consumption for a housing unit. Meters with an overall length of 110mm and 3/4” male threaded connectors can be used. The home outlet provides the housing unit with cold water.
	KWA cold water home outlet with meter line (2 adapters)	Cold water meter line to measure the difference between cold water inlet and cold water outlet. It can be used with meters that have an overall length of 110mm and 3/4” male threaded connectors. The home outlet provides the housing unit with cold water.

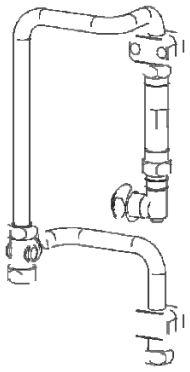
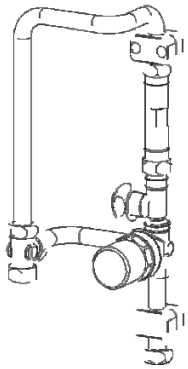
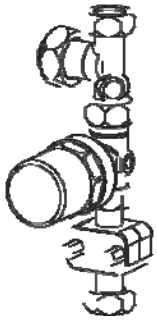
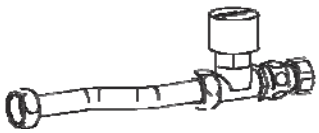
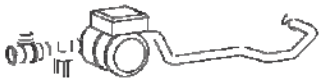
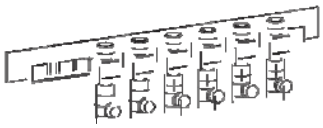
Illustration	Component	Description
	TWW warm water meter line	The TWW meter line is used to collect the additional hot water from a housing unit. It can be used with meters that have an overall length of 110mm and 3/4” male threaded connectors.
	TWW warm water meter line with water hammer arrester	The TWW meter line with water hammer arrester is used to collect the additional hot water from a housing unit. It can be used with meters that have an overall length of 110m and 3/4” male threaded connectors. The water hammer arrester absorbs pressure peaks in the cold water lines, protecting the bolted heat exchanger.
	water hammer arrester	The water hammer arrester absorbs pressure peaks in the cold water lines, protecting the bolted heat exchanger. The water hammer arrester is installed at the factory if a bolted plate heat exchanger is used.
	RTB return temperature limiter	Return temperature limiters protect the fixed return temperature coming from the home heating circuit. This is important for condensing technology or alternative energies. It ensures the return temperature in the system even in poorly designed home heating circuits.
	SF dirt trap (set)	The dirt trap is installed in the secondary return. It protects the heat meter and the regulating valves in the unit. The dirt trap eliminates contaminants from the home heating circuit, especially in existing systems.
	drain set	Tool for draining and filling the unit or the home heating in the event of servicing.
	ball valves in straight or angled configuration	The ball valves are only used as shut-off valves. The sanitary ball valves are approved by the DVGW.

Illustration	Component	Description
	ESPK injection circuit	The ESPK is used to regulate the temperature of a subfloor heater. You can choose between a constant value and external temperature control The thermostatic actuator has a temperature range from 20 - 50°C.The regulator fitting in the bypass control allows you to balance the constant volume with the injection circuit. A UPS 15-60 pump (equivalent to 25-60) provides for the circulation of the constant volume portion. Other pump models may be installed if desired, after technical consultation.
	under-floor distributors	Under-floor distributors are responsible for the division of heating circuits in sub-floor heating systems. These allow the heating circuit to be balanced, closed off and individually regulated. Regulation is handled through individual 2-point actuators on individual room control A large number of control options are available to choose from.
	BZW service water circulation	The service water circulation is for long hot water lines of more than 7 meters and provides necessary comfort according to VDI 6003.
	surface-mounted rails	Surface-mounted rails are used for pre-assembly of the pipe connectors. These are installed shortly before delivery to the home. The necessary shut-off valves are included in the scope of delivery.
	flush-mounted boxes	Flush-mounted boxes are used to pre-assemble the pipe connectors and mount them inside the wall. They are installed after framing is completed. A white frame with a door closes the box within the wall yet allows ready access to the device.
	surface trim	Surface trim covers the device in surface-mounted areas.

4.3 Hydraulic Schematic for the Apartment unit

The hydraulic schematic shown is a schematic diagram and does not represent every possible configuration. All information is subject to change. Also refer to the product configuration.

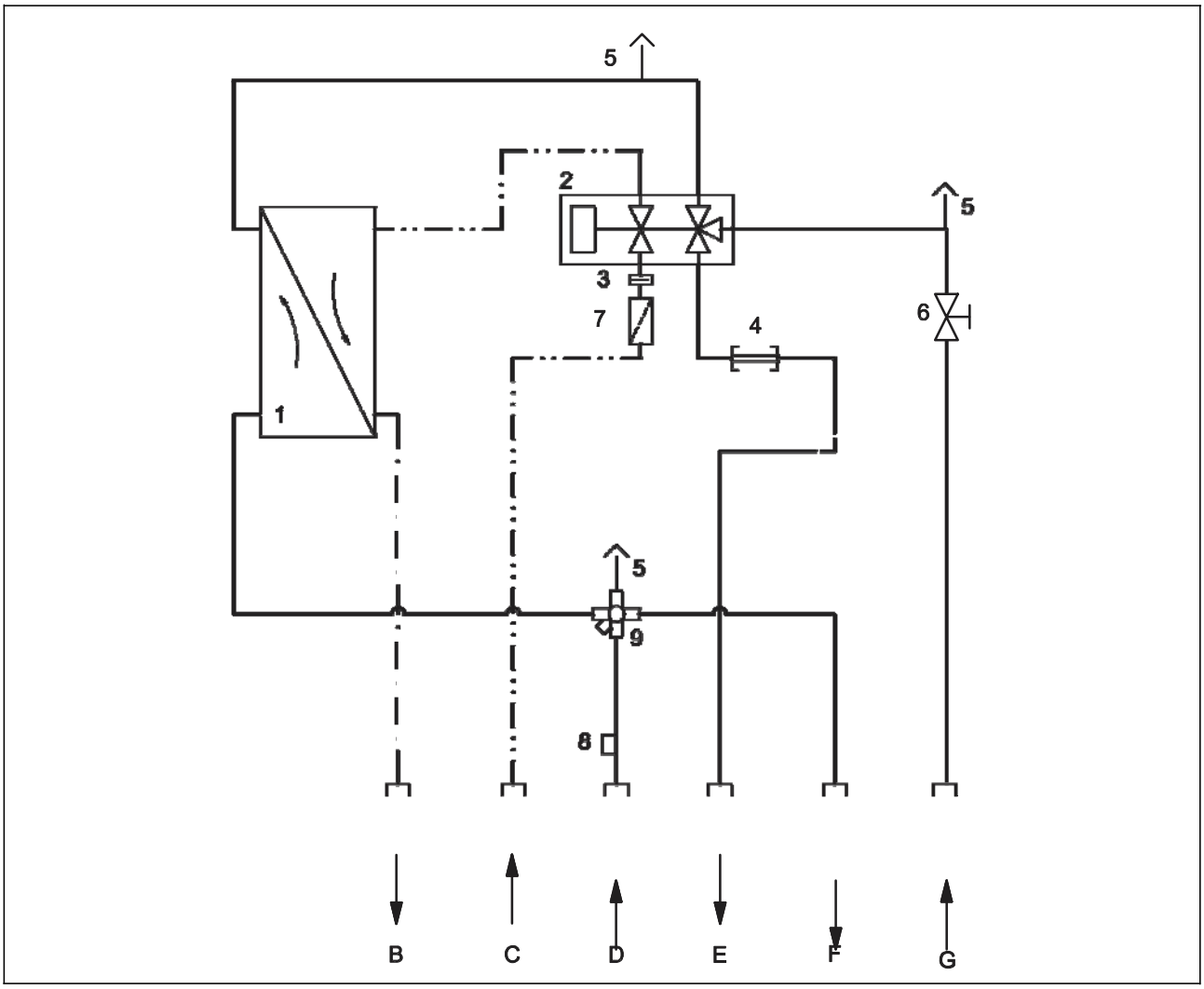


Fig. 4.3 Hydraulic schematic - Apartment unit (WK) basic configuration (schematic diagram)

(1) plate heat exchanger
WP24-14
WP24-20
WP24-30
WP24-40
(2) proportional flow valve (PM-valve)
(3) cold water throttle plate (in screw connector)
(4) WMZ-adapter (110mm x 3/4" male thread)
(5) ventilation
(6) zone valve to limit heating volume flow - home
(7) cold water dirt trap
(8) sensor pocket WMZ M10 x 1 submersible
(9) dirt trap hot water inlet from line

(B) hot water to home
(C) cold water from line
(D) primary heating supply
(E) primary heating return
(F) secondary heating supply
(G) secondary heating return

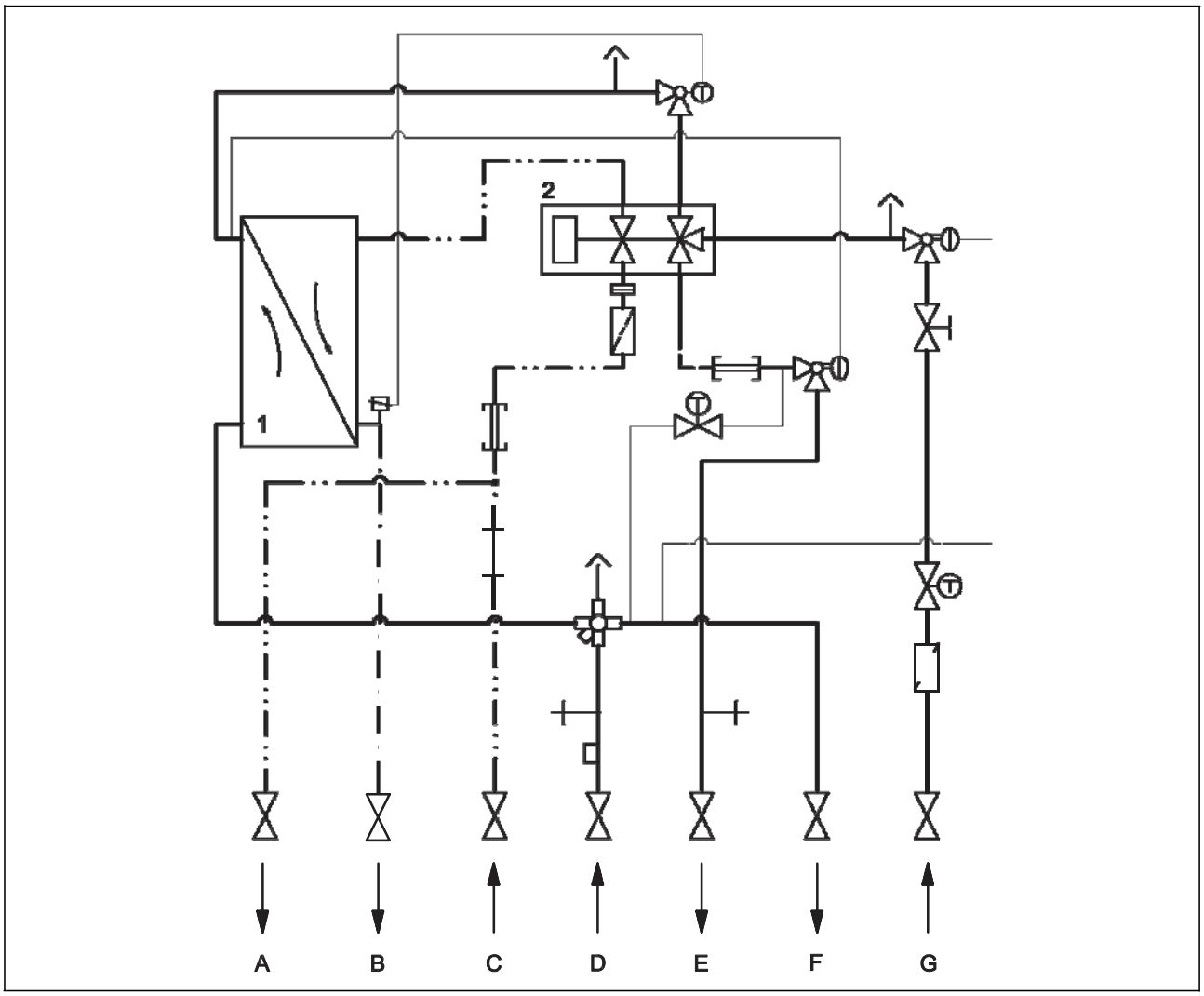


Fig. 4.4 Hydraulic schematic - Apartment unit (WK) complete configuration (schematic diagram)

(1) plate heat exchanger
WP24-14
WP24-20
WP24-30
WP24-40
(2) proportional flow valve (PM-valve)

(A) cold water to home
(Option)
(B) hot water to home
(C) cold water from line
(D) primary flow heating
(E) primary return heating
(F) secondary flow heating
(G) secondary return heating

	ventilation
	thermostatic warm water regulator
	differential pressure regulator
	zone valve to limit heating volume flow - home
	RTB return temperature limiter
	dirt trap
	dirt trap hot water inlet from line
	WMZ adapter (110mm x 3/4” male thread)
	cold water throttle plate (in screw connector)
	TTV thermostatic temperature holding module
	drain, 3/4” hose connection
	shut-off valve
	sensor pocket WMZ M10x1 submersible
	hot/cold water meter adapter (110mm x 3/4” male thread)

4.4 Application Example

Refer to the product configuration.

4.5 Modes of Operation

The Apartment unit combines two modes of operation: hot water preparation and home heating circuit.

You do not need to change any settings for hot water preparation because these are set by the heating system and by the configuration.

4.6 Functions

The Apartment units are preset. These are integrated as elements of the complete heating system.

5 Installation

5.1 Storage

CAUTION!

Damage due to improper storage!

Improper storage can cause individual components to be destroyed. Damage can arise in freezing temperatures
if moisture enters the unit.

- ▶ Be sure to store units in optimal conditions.
- ▶ Always store units in a dry location protected from weather.
- ▶ Before installation, always keep units in sealed factory packaging.

The device is designed for dry storage in the factory packaging.

- ▶ Be sure to provide the following optimal storage conditions:
  - enclosed space
  - ambient temperature from 0°C to +50°C
  - dry and free of dust
- ▶ Avoid the following:
  - corrosive substances
  - large amounts of sunlight
  - mechanical stress
  - mechanical vibrations
- ▶ During long-term storage, regularly check the overall condition of all components and packaging.
- ▶ Repair defective packaging as needed.

5.2 Transportation of Units

DANGER! **Risk of injury due to improper handling!**

Improper handling can lead to bruises, contusions, and cuts.

▶ Always wear protective gear (safety shoes and protective gloves) during handling and transport.

CAUTION! **Damage due to improper transport!**

Damage can result from improper transport.

▶ Always load packages carefully when transporting.

▶ Avoid strong shocks or impacts to packaging.

▶ Do not remove from packaging until immediately before installation.

▶ Before installation, always transport units in sealed factory packaging.

The unit is light enough to be carried by hand. For transport over long distances, you can use an appropriate transport device (for example, handcart or transport trolley).

▶ When using a transport device, be sure to guard against slippage.

5.3 Installation Location

5.3.1 Installation Location Requirements

The device installation location must meet the following requirements:

- the operating conditions for the device (⇨ *Sec. 2.8 "Operating Conditions"*),
- the appropriate local regulations for installation locations and
- the appropriate local regulations for electrical connections

The installation wall must be vertical and provide sufficient load capacity for the weight of the Apartment unit. If the wall does not provide sufficient load capacity, you must design and implement suitable construction measures.

5.3.2 Minimum Mounting Distances

▶ Refer to the dimensions in the installation diagram in the product configuration.

▶ During installation, maintain sufficient distance from all walls and other heating components in order to carry out all installation and maintenance work

5.4 Unpack and Check Delivery

- Observe all notices on the packaging.
- Unpack the unit carefully.
- Remove the packaging material from the unit and all enclosed parts.
- Inspect the delivery immediately upon receipt for completeness and for damage according to the bill of lading.
- In case of damage, only accept the shipment conditionally.
- Make note of any damages on the bill of lading and transport papers.
- Contact customer service (⇨ *Sec. 12.2 "Customer Service"*).
- Do not install any damaged parts.

5.5 Dispose of Packaging

- Properly dispose of all packaging materials.
  (⇨ *Sec. 11 "Disposal and Recycling"*).

5.6 Installation Steps

Follow these steps to install the Apartment unit:

1. Attach the Apartment unit.
2. Connect the hydraulic systems.
3. Install the electrical connections.
4. Perform the final installation steps.

These installation steps are described below in more detail.

5.6.1 Attach the Apartment unit

DANGER!

Risk of injury due to improper handling!

Improper handling can lead to bruises, contusions, and cuts.

▶ Always wear protective gear (safety shoes and protective gloves) during handling and transport.

CAUTION!

Damage due to improper lifting!

Do not lift the unit by any installed components. These can be damaged.

▶ Only lift the unpacked unit (without packaging) by the frame or the baseplate.

CAUTION!

Damage due to improper installation!

The enclosed mounting anchors and screws are not suited for all wall types and under certain circumstances may not support the weight, which can cause the unit to fall or loosen.

▶ Verify that the enclosed mounting hardware is suitable for the wall where the unit is to be mounted.

▶ If necessary, use different mounting hardware that is suitable for the wall where the unit is to be mounted.

Depending on the construction, there are three possibilities for mounting the Apartment unit:

- surface installation without connection rail
- surface installation with connection rail
- installation in flush-mounted box

Surface Installation Without Connection Rail

The illustration shown is a schematic diagram and does not represent every possible configuration. All information is subject to change. Also refer to the product configuration.

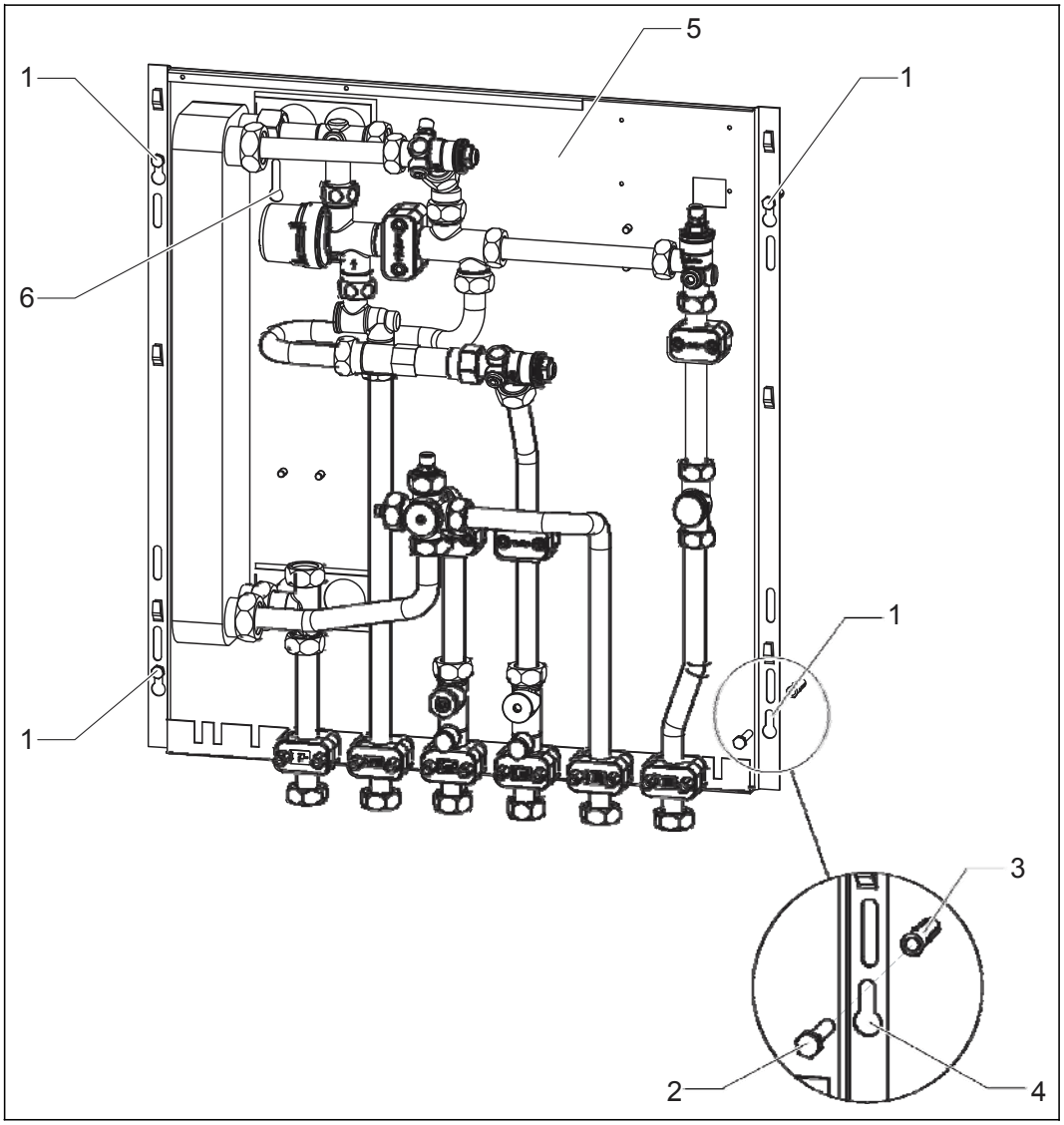


Fig. 5.1 Apartment unit (WK wide) surface installation without connection rail (schematic diagram)

(1) mounting points
(2) screw
(3) screw anchor
(4) hole
(5) baseplate
(6) alternate mounting for large heat exchanger

For a surface installation without connection rail, the Apartment unit is mounted to the wall.

Follow these steps to mount the Apartment unit.

1 Mark the mounting holes.

▶ Mark the position of the mounting holes as shown in the installation diagram in the product configuration.

2 Drill the mounting holes.

- ▶ Drill the holes so that the enclosed anchors (plastic spreading anchors for concrete and masonry work) can be inserted into the holes flush and free of play.
- ▶ Remember:
  The diameter and depth of the holes depend upon the anchors and the wall thickness.

3 Mount the Apartment unit.

- ▶ Position the Apartment unit vertically and horizontally.
- ▶ Insert the enclosed screws with the washers into the mounting points on the baseplate.
- ▶ Tighten the mounting screws until the Apartment unit is seated on the wall. Do not overtighten.

▷ The Apartment unit is attached to the wall.

Wall Installation with Connection Rail

The illustration shown is a schematic diagram and does not represent every possible configuration. All information subject to change. Also refer to the product configuration.

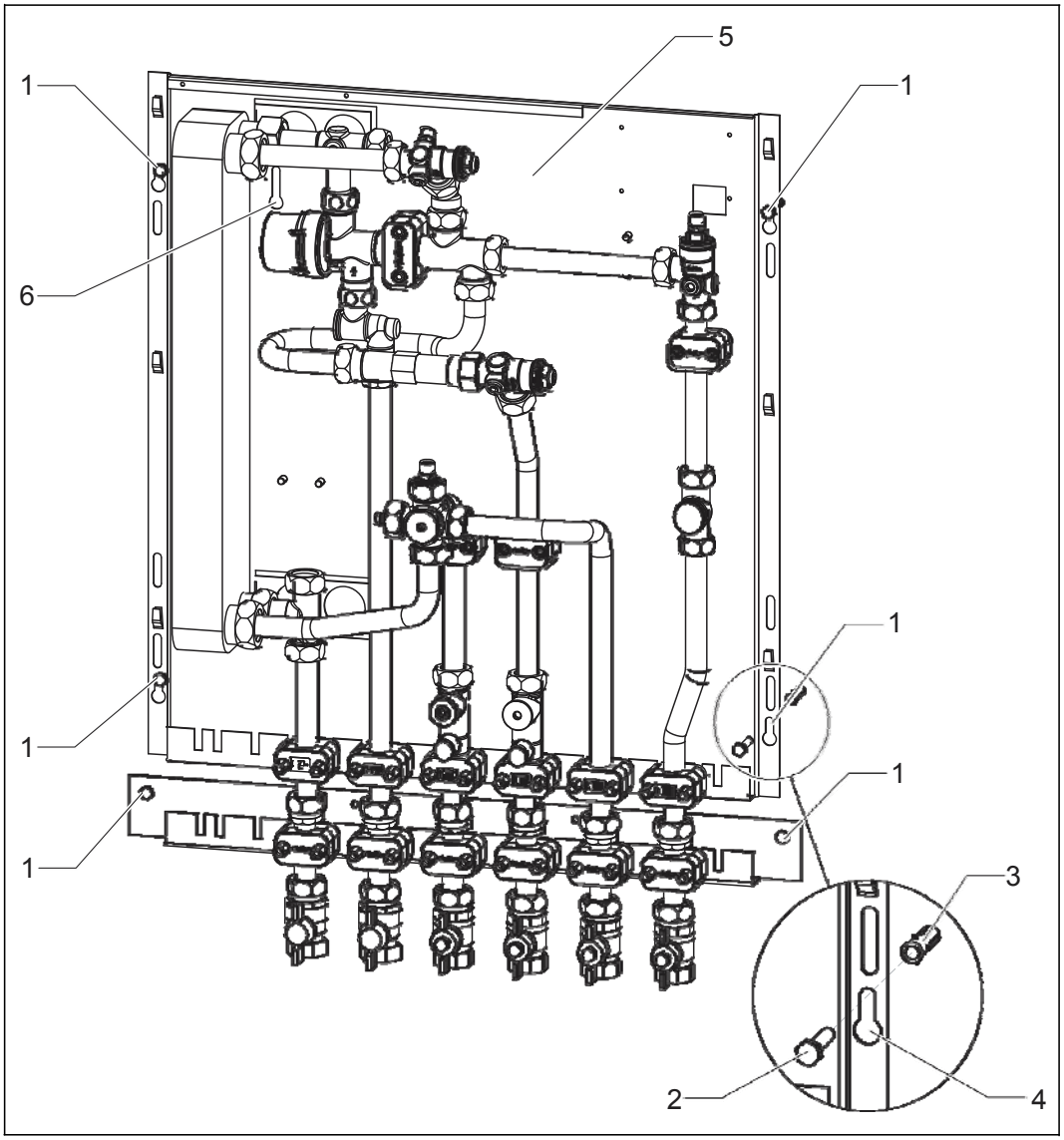


Fig. 5.2 Apartment unit (WK wide) surface mount with connection rail (schematic diagram)

(1) mounting points
(2) screw
(3) screw anchor
(4) hole
(5) baseplate
(6) alternate mounting for large heat exchanger

For a surface installation with connection rail, a mounting bar with a ball valve is delivered to the construction site while the building is being framed. This allows the pipelines to be preinstalled, flushed, and filled. The unit is installed later.

Follow these steps to mount the Apartment unit with connection rail:

1 Mark the mounting holes for the connection rail.

- ▶ Mark the position of the mounting holes as shown in the installation diagram in the product configuration.

2 Drill the mounting holes for the connection rail.

- ▶ Drill the holes so that the enclosed anchors (plastic spreading anchors for concrete and masonry work) can be inserted into the holes flush and free of play.
- ▶ Remember:
  The diameter and depth of the holes depend upon the anchors and the wall thickness.

3 Mount the connection rail.

- ▶ Position the connection rail vertically and horizontally according to the product configuration.
- ▶ Insert the mounting screws with the enclosed washers.
- ▶ Tighten the mounting screws until the Apartment unit is seated on the wall. Do not overtighten.

▷ The connection rail is mounted on the wall, and the pipelines can be preinstalled.

4 Mark the mounting holes for the Apartment unit.

- ▶ Bear in mind the size of the pipe spacing as shown in the installation diagram in the product configuration.
- ▶ Mark the position of the mounting holes as shown in the installation diagram in the product configuration.

5 Drill the mounting holes for the Apartment unit.

- ▶ Drill the holes so that the enclosed anchors (plastic spreading anchors for concrete and masonry work) can be inserted into the holes flush and free of play.
- ▶ Remember:
  The diameter and depth of the holes depend upon the anchors and the wall thickness.

6 Mount the Apartment unit.

- ▶ Position the Apartment unit on the connections (nozzles) of the connection rail and tighten these.
- ▶ Insert the enclosed screws with washers into the mounting points in the baseplate.
- ▶ Tighten the mounting screws until the Apartment unit is seated on the wall. Do not overtighten.

▷ The Apartment unit with connection rail is mounted on the wall.

Installation in Flush-Mounted Box

The illustration shown is a schematic diagram and does not represent every possible configuration. All information is subject to change. Also refer to the product configuration.

The flush-mounted box allows the Apartment unit to be integrated into a wall. For installation in a flush-mounted box, a case with a connection rail, frame and door is delivered to the construction site. This allows the pipelines to be preinstalled and the main unit to be installed later.

Follow these steps to mount the Apartment unit with a flush-mounted box:

1 Prepare the flush-mounted box.

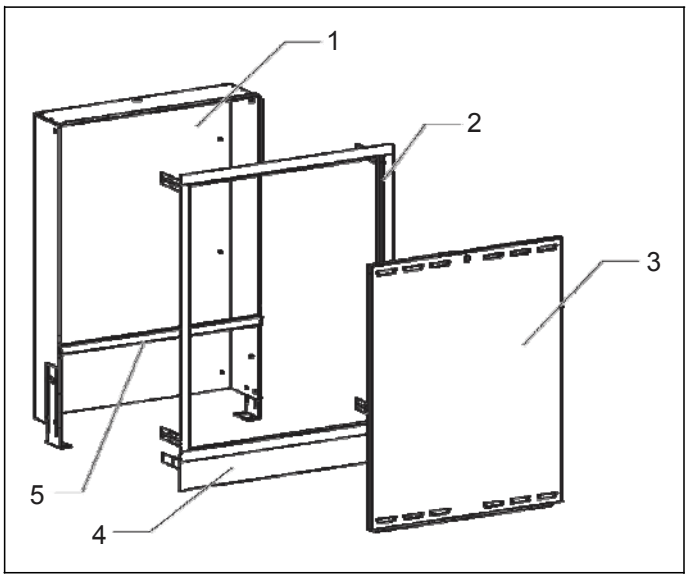


Fig. 5.3 Flush-mounted box (schematic diagram without connection rail)

(1) case
(2) frame
(3) door
(4) screed baffle plate
(5) cross member

- Remove the frame and the door by pulling both forward out of the case.
- Keep the frame, door, and connection rail for later installation.
- Install the accompanying cross member on the flush-mounted box according to the product configuration.

2 Mark the mounting holes for the case.

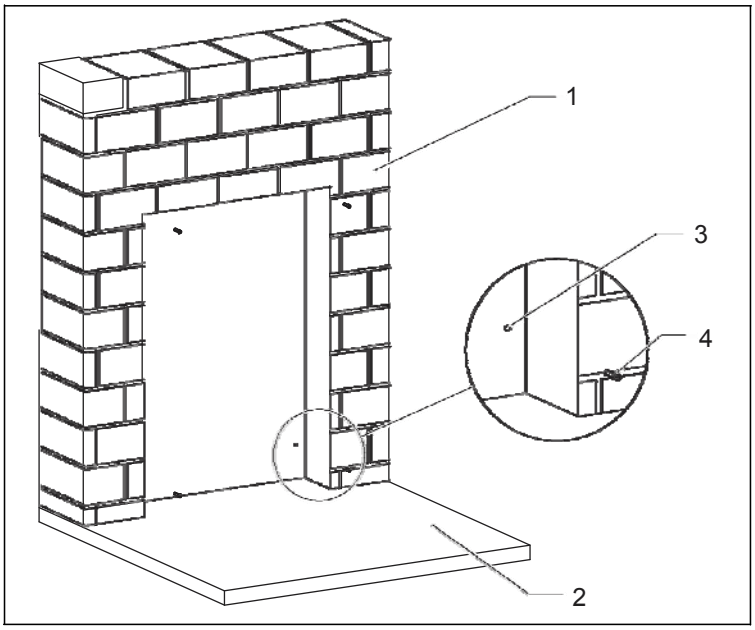


Fig. 5.4 **Mark and drill the mounting holes for the case. (schematic diagram)**

(1) wall
(2) unfinished floor
(3) hole
(4) screw anchor

- For freestanding installation:
  Set the depth according to the product configuration.
  Use the adjustable feet to set the height (⇨ *Fig. 5.7*).
- Mark the position of the mounting holes on the wall.

3 Drill the mounting holes for the case.

- When dry mounting (for example, in studs), note the installation dimensions in the product configuration.
- Be sure that you have a proper screw connection to the wall.
- Drill the holes so that the enclosed anchors (plastic spreading anchors for concrete and masonry work) can be inserted into the holes flush and free of play.
- Remember:
  The diameter and depth of the holes depend upon the anchors and the wall thickness.

4 Mount and fasten the case.

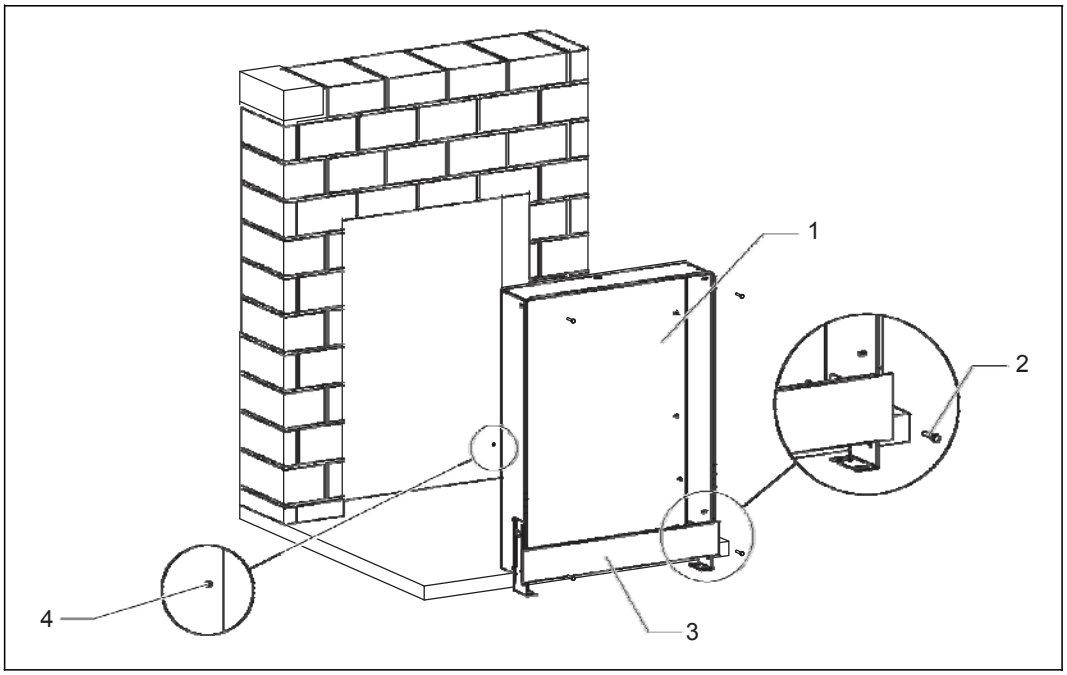


Abb. 5.5 Mount and fasten the case. (schematic diagram)

(1) case
(2) screw
(3) screed baffle plate
(4) screw anchor

▶ Refer to the product configuration to find the measurements for the installation height.

▶ Position the case on the wall.

▶ Insert the enclosed screws.

▶ Tighten the mounting screws until the case is seated. Do not overtighten.

▶ For freestanding installation, position the screed baffle plate to allow for depth adjustment and levelling.

If the connection rail is not yet installed, install it as described in the following steps.

5 Attach the connection rail

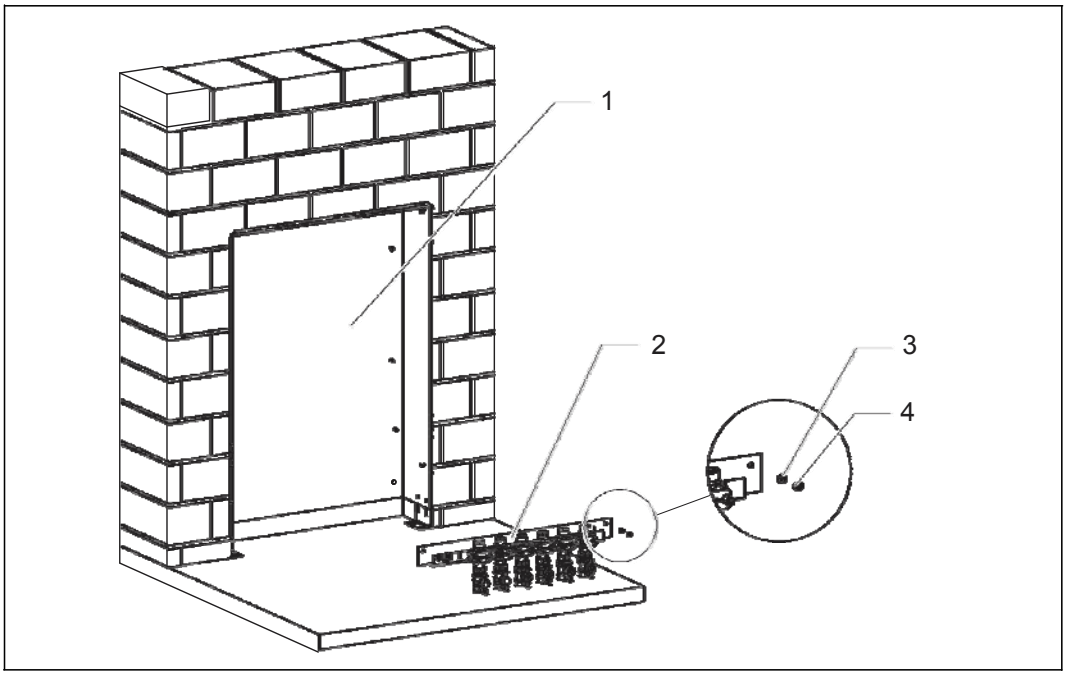


Fig. 5.6 Mount the connection rail in the flush-mounted box

(1) case
(2) connection rail
(3) washer
(4) nut

▶ Remove the cross member in the wall box.

The cross member is no longer needed and, in most cases, can be disposed of.

▶ Position the connection rail on the bolts in the flush-mounted box.
Refer to the appropriate installation diagram in the product configuration.

▶ Attach the enclosed washers and nuts.

▶ Align the connection rail vertically and horizontally.

▶ Tighten the nuts unto the connection rail is seated. Do not overtighten.

6 Mount the Apartment unit in the flush-mounted box.

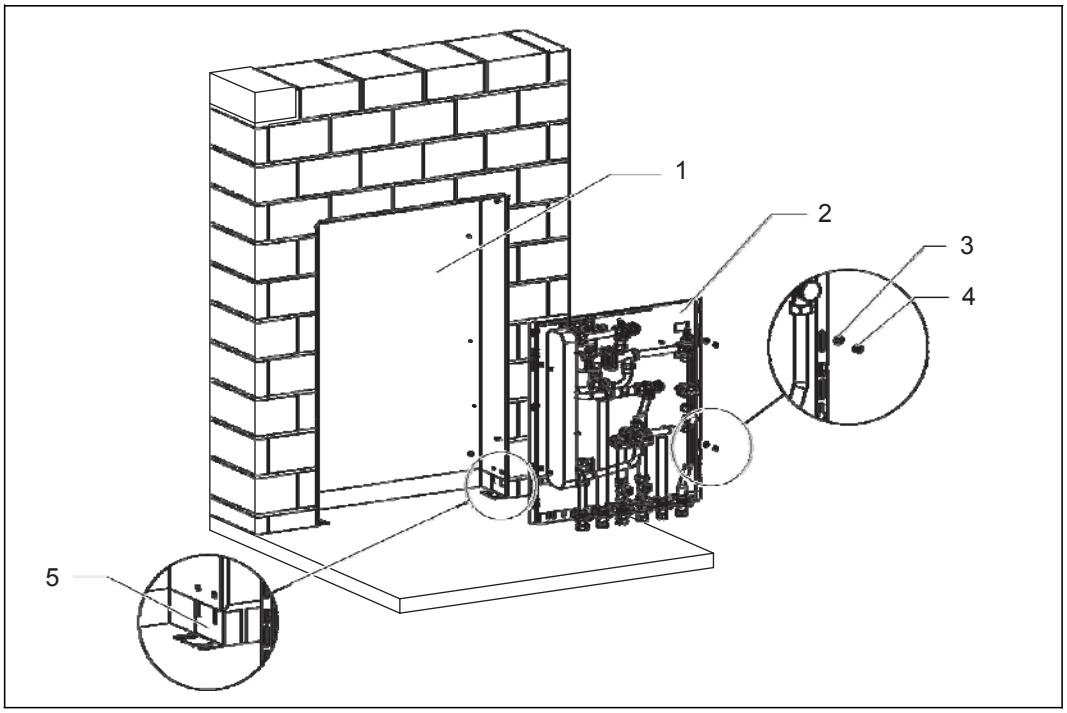


Fig. 5.7 **Mount main unit in the flush-mounted box (schematic diagram without connection rail)**

(1) case
(2) main unit
(3) washer
(4) nut
(5) feet

▶ If you have not yet done so, remove the cross member in the flush-mounted box.

The cross member is no longer needed and, in most cases, can be disposed of.

▶ Position the Apartment unit on the bolts in the flush-mounted box.
Refer to the appropriate installation diagram in the product configuration.

▶ Attach the enclosed washers and nuts.

▶ Align the Apartment unit vertically and horizontally.

▶ Tighten the nuts until the Apartment unit is seated. Do not overtighten.

7 Mount the frame and the door.

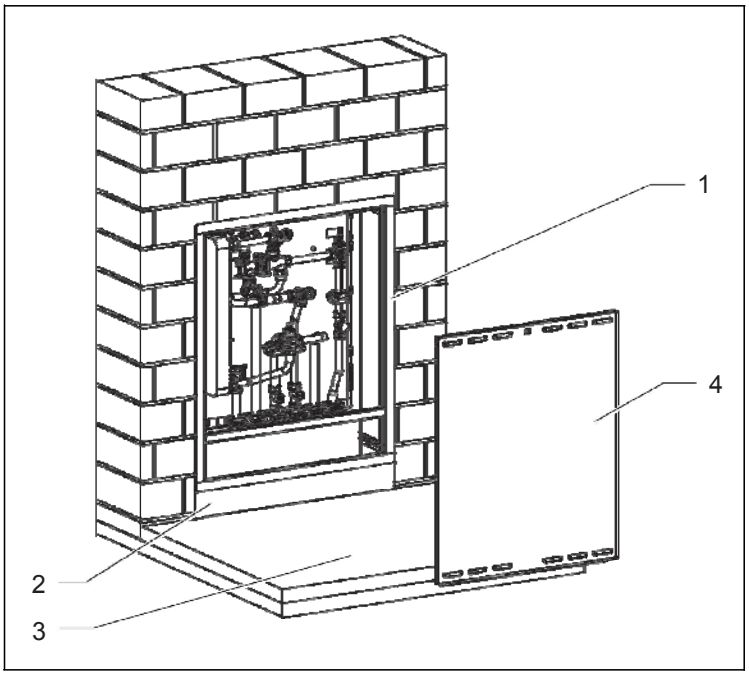


Fig. 5.8 Mount the frame, screed baffle plate and door (schematic diagram without connection rail)

(1) frame
(2) screed baffle plate
(3) screed floor
(4) door

- ▶ Press the frame with the attachment flaps onto the mounting bolts.
- ▶ Tighten the four wingnuts.
- ▶ Insert the door.

▷ The Apartment unit is fastened to the wall with the flush-mounted box.

5.6.2 Connect Hydraulic Systems

DANGER!

Risk of injury from improper installation!

Persons can be injured by connections that are not tight.

- ▶ Connect the hydraulic systems properly.
- ▶ Use the enclosed gaskets when connecting the pipelines.

To ensure flawless operation of the heating system, do not reduce the predefined line diameters.

Connections for optional components (for example, meters) are closed off in the unit with black plastic adapters. If the adapters are not used for optional components, you must replace the plastic adapters with tubes of 1.4401 stainless steel. These can be obtained from your distributor.

- ▶ Take note of the correct connections for heating supply and return as well as hot and cold water.
- ▶ Install a fill/drain valve in a convenient central location to fill the central heating system.
- ▶ Refer to the hydraulic diagram in the product configuration for help with the installation. Follow these steps to connect the hydraulic systems:

1 Create the pipelines.

- ▶ Create the pipelines according to your design.

2 Mount the pipelines.

- ▶ Mount the pipelines onto the Apartment unit according to your design.

3 Insulate the pipelines according to national regulations.

- ▶ Insulate the pipelines with thermal insulation.

▷ The Apartment unit is hydraulically connected.

5.6.3 Install the Electrical Connections

DANGER! **Risk of death due to electrical shock!**

Controllers and pumps are connected to electrical current. Contact with components that carry electrical current
can lead to risk of death.

- ▶ Disconnect the power supply immediately before beginning work on any electrical components and safeguard against unintentional reconnection.
- ▶ All work on electrical components is only to be performed by qualified electricians.
- ▶ Never allow wet or damp body parts to touch electrical components.
- ▶ Never pull on electrical wires or connections.

CAUTION! **Property damage due to overheating!**

Electrical wires can be damaged by the heated surfaces of components.

- ▶ Be sure that electrical cables are physically removed from components with hot surfaces.

CAUTION! **Malfunction due to electrical fields!**

Mains cables (230V) can affect sensor cables (low voltage).

- ▶ Keep mains cables and sensor cables physically separated.

In its basic configuration, the Apartment unit does not need electrical installation.

However, the Apartment unit may include optional components that require an electrical connection. The following statements apply for electrical connections:

- ▶ Electrical work should only be performed by qualified professionals.
- ▶ Pay attention to the information and statements on enclosed wires for each electrical component.
- ▶ Pay attention to national regulations and guidelines.
- ▶ When designing the electrical system, be sure to observe to the necessary protection area in the installation location.

▷ The electrical connections are installed.

5.6.4 Perform the Final Installation Steps

- ▶ Perform a visual inspection of all installed components and connections.

▷ Installation of the Apartment unit is complete. Next you must commission the unit (⇨ *Sec. 6 "Commissioning"*).

6 Commissioning

CAUTION!

Property damage due to improper commissioning!

Improper commissioning can lead to property damage.

- ▶ Commissioning is only to be performed by an authorised technician.

When commissioning the unit, pay attention to the following cleaning information:
Before you fill the unit, you must flush the entire heating system and the home heating circuit thoroughly and carefully.
Before commission the unit, you must inspect the dirt trap and clean or flush it if necessary.
Check the flat sealing connections in the Apartment unit for leaks. Tighten the connections if necessary. Always secure the opposite side when re-tightening the connections.
Open the bleed screw to exhaust the air that is trapped in the Apartment unit. Pay attention to the system operation pressure.

Follow these steps to put the Apartment unit in service.

1. Inspect the device before commissioning
2. Flush the system
3. Fill the system
4. Bleed the system
5. Verify the settings
6. Fill out the acceptance (commissioning) certificate
7. Transfer the device to the operator

These steps are described below in more detail.

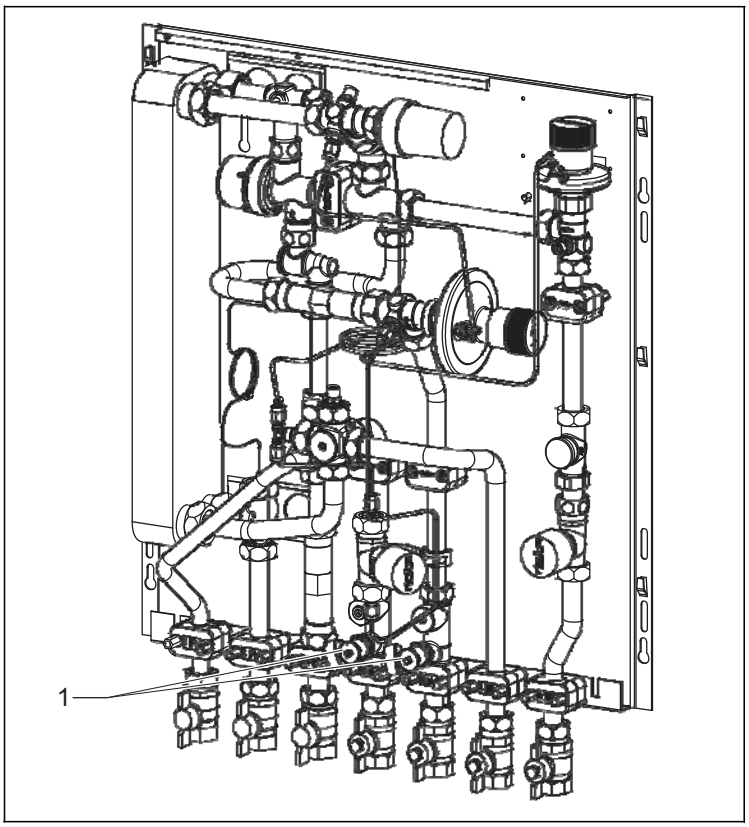
6.1 Inspect the Device Before Commissioning

Before commissioning, you must perform a visual inspection of the device for proper installation as follows:

- ▶ Verify that the device was properly cleaned of dirt and dust during the installation.
- ▶ Check all pipelines and device connections for leaks.
- ▶ Optional checks: Verify that all electrical connections were made correctly, that the polarity of the mains connection is correct, and that the unit is properly earthed.

If the visual inspection uncovers an issue with the installation, you should avoid stop provisioning until the issue is corrected.

6.2 Flush the System



1 Fill with heating water.

Fig. 6.1 Fill/drain valves on the Apartment unit (WK wide) - (schematic diagram)

(1) fill/drain valves

- ▶ Use the fill/drain valves to fill the Apartment unit with heating water. (The exact position is described in the product configuration.)

2 Flush the Apartment unit.

- ▶ Open the other fill/drain valve.
- ▶ Run the heating water out of the Apartment unit into a suitable collecting vessel.

6.3 Fill the System

Follow these steps to fill the Apartment unit:

- ▶ Use the fill/drain valve to fill the Apartment unit with heating water again. (⇨ *Fig. 6.1*).

6.4 Bleed the System

Follow these steps to bleed the system.

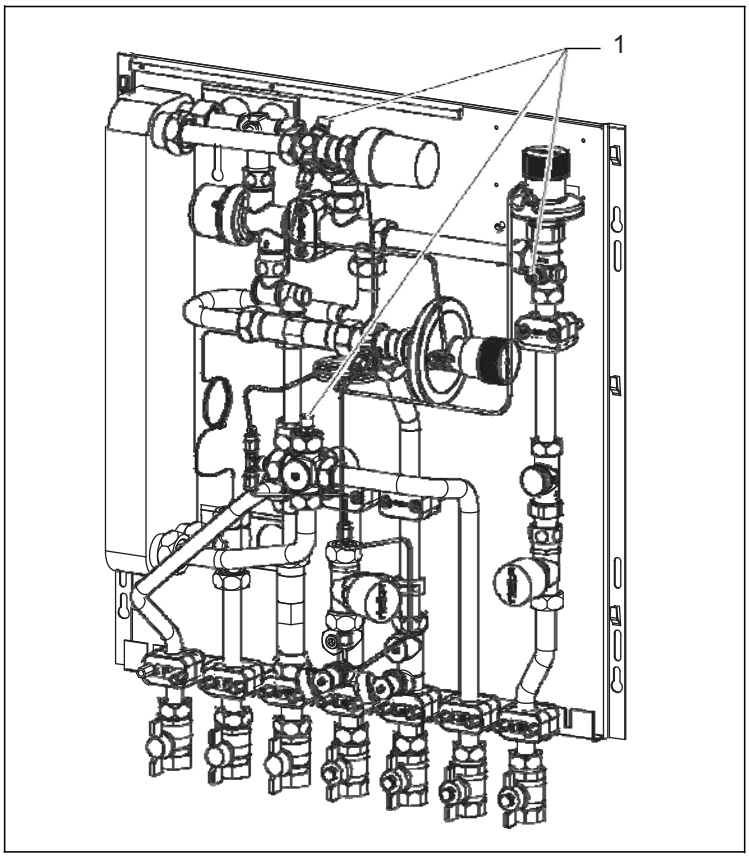


Fig. 6.2 Bleed valves on the Apartment unit (WK wide) - (schematic diagram)

(1) Bleed valves

▶ Use the bleed valves to bleed the Apartment unit. (The exact position is described in the product configuration.)

6.5 Verify the Settings

▶ Check the setting values for the following components, if they are installed on the Apartment unit:

- zone valve
- cold water throttle
- cold water home outlet with meter line (KWA)
- heat meter line (WMZ)
- differential pressure regulator (DDR) in the device inlet/home heating circuit
- thermostatic temperature holding module (TTV)
- return temperature limiter (RTB)
- thermostatic hot water regulator (TWR)
- injection circuit (ESPK)

▶ Adjust the component setting values, if necessary.

Also refer to the product configuration and your system design.

The steps and the components are described in detail below.

6.5.1 Zone Valve

The regulator valve for the heating side performs a hydraulic balance of the water volume in the Apartment unit's heating circuit. The valve may have an optional actuator installed, which is controlled by a room thermostat.

The zone valve allows for a problem-free adjustment of the mass flow rates for the required heating demands and is set at the factory. You can adjust the default setting to the desired value at any time, even during operation.

Settings:

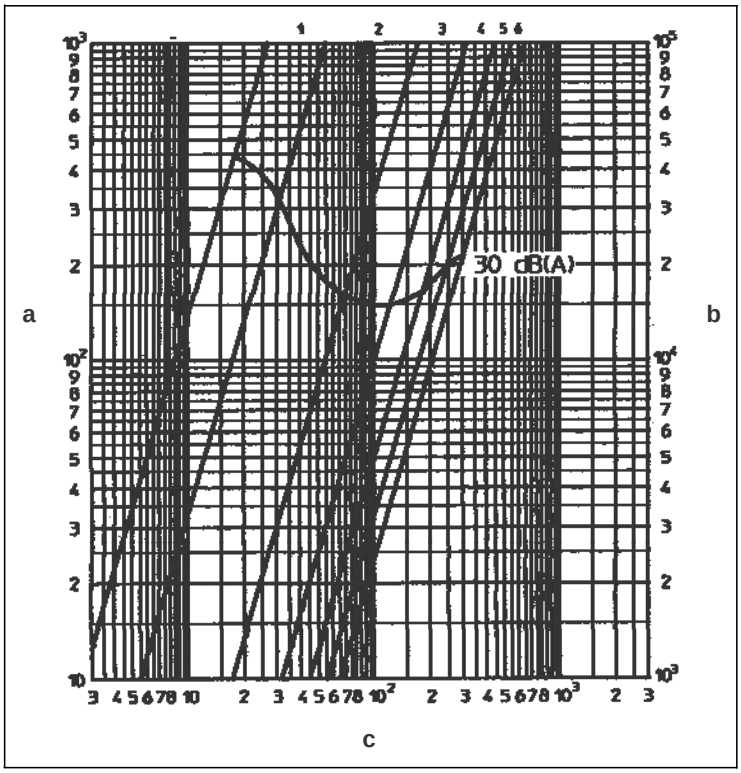


Fig. 6.3 Pressure loss diagram

(a) pressure loss Δp [mbar]
(b) pressure loss Δp [Pascal]
(c) mass flow qm [kg/h]

Settings	1	2	3	4	5	6
k_V	0.027 to 0.055	0.056 to 0.170	0.171 to 0.313	0.314 to 0.446	0.447 to 0.56	0.57 to 0.65

Follow these steps to set the desired values:

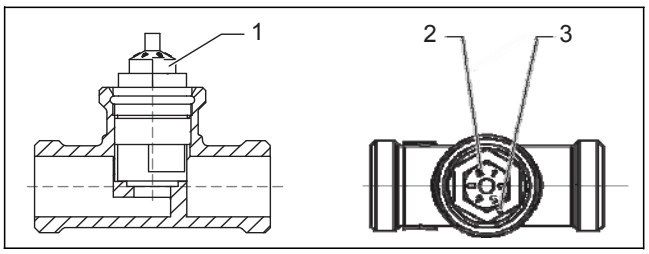


Fig. 6.4 Adjust the zone valve

(1) Allen nut 13 mm
(2) setting
(3) mark

- ▶ Adjust the desired setting at the Allen nut with an open-end spanner SW 13 or with a special spanner.
- ▶ Remember:
  The desired setting must point to the mark. Intermediate positions are not allowed.

6.5.2 Cold Water Throttle

A throttle plate is located in the compression fitting between the cold water connection on the PM valve and the cold water dirt trap. This piece limits the cold water flow to the heat exchanger and prevents the cold water flow (and therefore the hot water supply) from exceeding the calculated amount. If necessary, you can replace the installed throttle plate with another suitable throttle plate (see table). The stated maximum flow volume of the throttle plate usage is colour-coded.

Colour	blue	red	green	brown
Max. volume flow	10 l/min	12 l/min	15 l/min	17 l/min

Follow these steps to set the desired values:

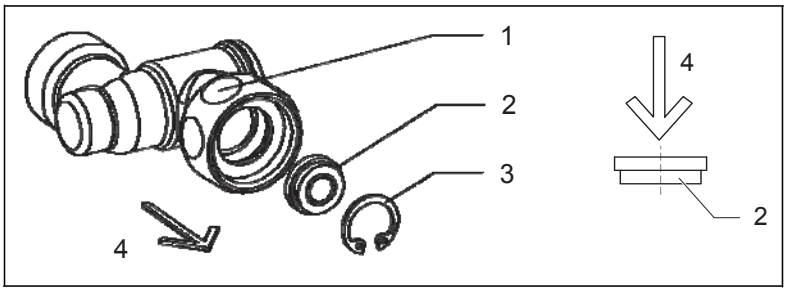


Fig. 6.5 Replace throttle plate

(1) dirt trap
(2) throttle plate
(3) snap ring
(4) direction of flow

1 Remove the dirt trap.

2 Remove the snap ring.

▶ Use special pliers.

3 Replace the throttle plate according to the desired setting.

▶ Pay attention to the direction of flow when installing the throttle plate.

4 Install the snap ring.

▶ Use special pliers.

5 Install the dirt trap.

6.5.3 Cold Water Home Outlet with Meter Line

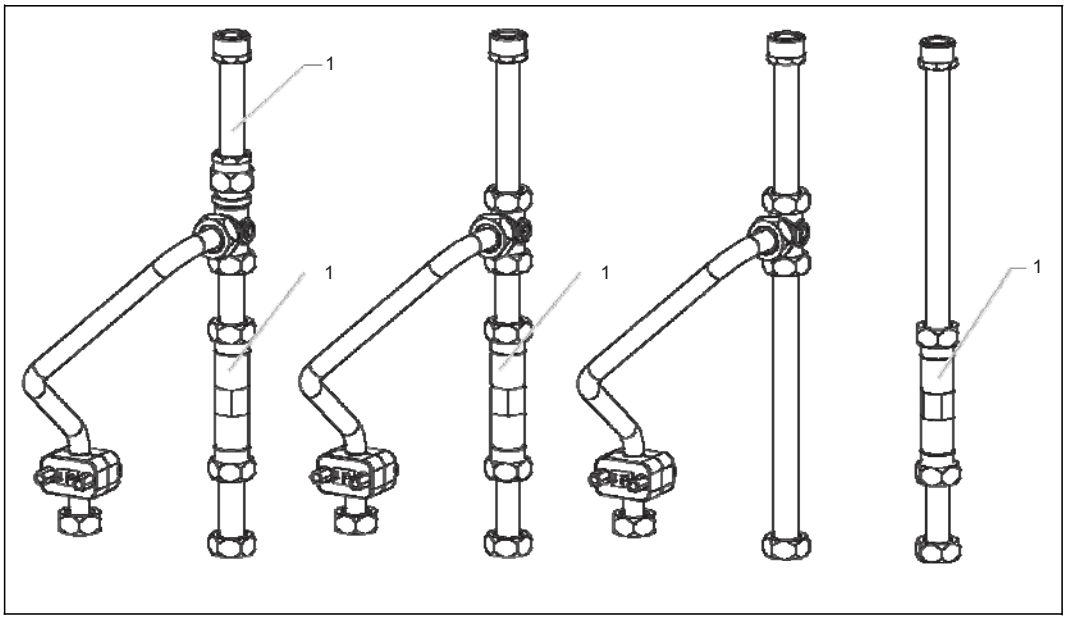


Fig. 6.6 Cold water home outlet

(1) Cold water adapter

The device may contain an optional cold water meter line with or without a home outlet. Any changes require the complete piece to be installed.

▶ Replace the cold water meter adapters with appropriate meters (at least QN =1.5).

For continuous operation:

▶ Replace the cold water meter adapters with stainless steel fittings.

6.5.4 Hot Water Meter Line

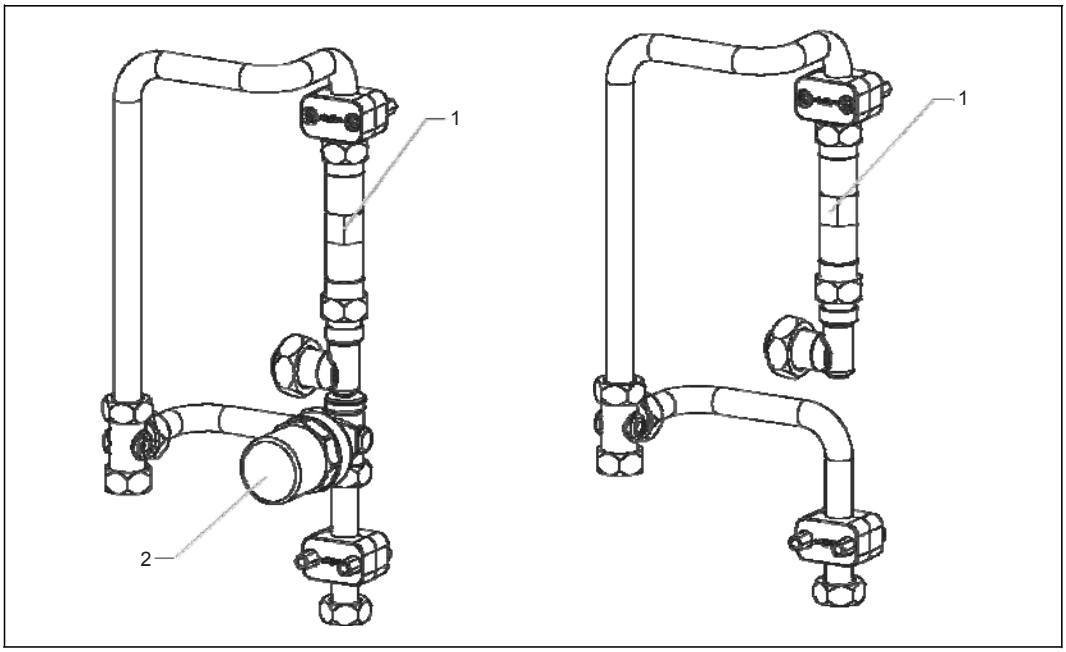


Fig. 6.7 Hot water meter line

(1) meter adapter
(2) water hammer arrester (used only with bolted heat exchanger)

The device may contain optional hot water meter lines with or without home outlets. Any changes require the complete piece to be installed.

▶ Replace the hot water meter adapters with appropriate meters (at least QN =1.5).

For continuous operation:

▶ Replace the hot water meter adapters with stainless steel fittings.

6.5.5 Heat Meter Line

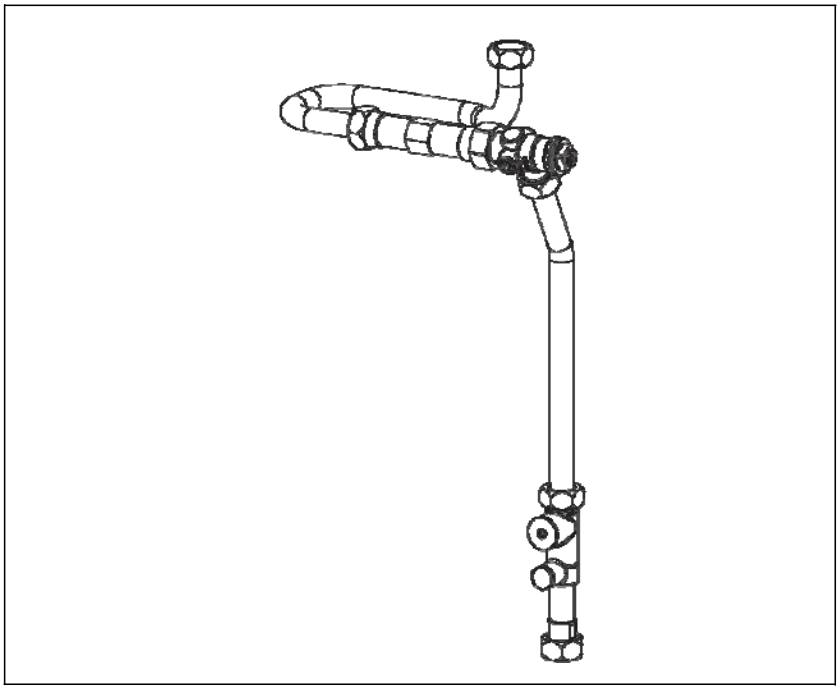


Fig. 6.8 Heat meter line

The heat meter line is installed horizontally so that energy usage can be accurately measured. This requires a heat meter with an over length of 110mm and 3/4” male threads.

▶ You must install a meter with Qn=1.5.

On-site, use heat meters with Qn=1.5 and a very fast sampling rate (1.5 - 2 sec. flow rate measurement, every 3-4 seconds full measurement, i.e. kWh calculation).

▶ Remember:
For systems that prepare hot water in the flow, a meter with a quick sampling rate and short times between full measurement is recommended. For the supply sensor, a sensor pocket of M10x1 is available. The unit is delivered from the factory with a plug installed; this plug must be removed with a 6mm Allen wrench.

For continuous operation:

The heat meter adapter is not suited for continuous operation.

▶ Replace the cold water meter adapters with stainless steel fittings.

6.5.6 Differential Pressure Regulator in the Device Inlet/Home Heating Circuit

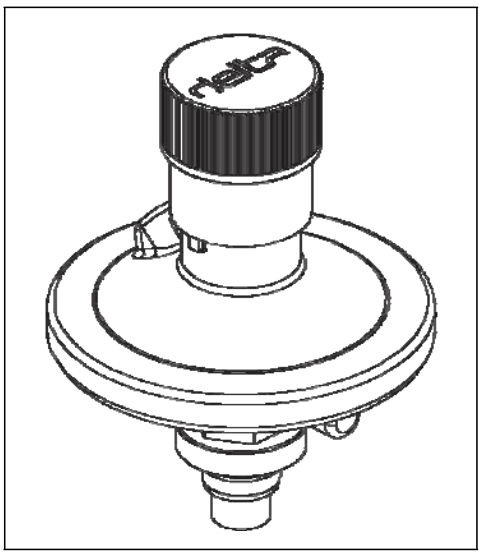


Fig. 6.9 Differential pressure regulator in the primary device inlet

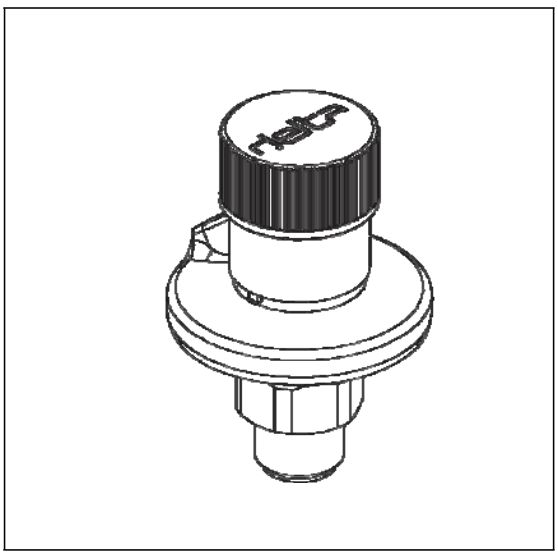


Fig. 6.10 Differential pressure regulator in the secondary home heating circuit

The differential pressure regulator is a proportional regulator that works without auxiliary power and keeps the differential pressure in the regulated line within a technically necessary proportional band.

The target value is infinitely adjustable. The adjustment range is imprinted on the cap. The nominal value can be locked and is viewable from the outside at any time.

▶ Turn the hand wheel to set the desired target value.

Primary differential pressure regulator:

Adjustment range: 100-400 mbar (preset to 200 mbar).

A higher setting means a higher flow rate for hot water preparation and, therefore, a higher pressure differential in the home heating circuit.

A lower setting means a lower flow rate for hot water preparation and, therefore, a lower pressure differential for the home heating circuit.

It may be necessary to readjust the differential pressure regulator due to pressure loss at the heat meter on-site. Every heat meter has different pressure losses at the same flow rate.

Secondary differential pressure regulator:

Adjustment range: 50-300 mbar (preset to 100 mbar).

A higher value means a higher pressure differential for the same high flow rate and for flow tests through thermostatic valves downstream.

A lower setting means a lower pressure differential for a lower flow rate and for lower flow noise through thermostatic valves.

You can find the exact range for the Apartment unit in the product configuration.

6.5.7 Thermostatic Temperature Holding Module (TTV)

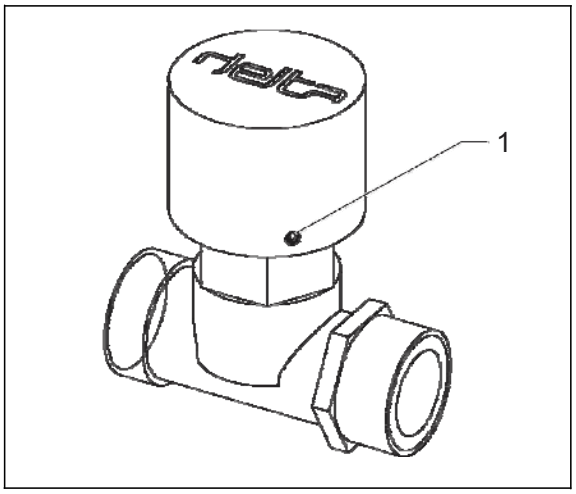


Fig. 6.11 Thermostatic temperature holding module

(1) 1.5mm Allen setscrew

The thermostatic temperature holding module keeps water from the supply line warm. The valve uses an adjustment scale, with the adjustment range imprinted on the cap. The cap can be tightened down with the setscrew. A sensor inserted directly in the valve body is responsible for temperature measurement. The setting is infinitely adjustable.

▶ Set the line temperature at the TTV to around 15 K below the network supply temperature.

If the line holding temperature is set too low, this can lead to long wait times for hot water preparation.

If the temperature is set too high, the heating water return temperature can increase.

▶ Remember:

- You can connect to the capillary tube Ø4 to change the flow rates across the valve.
- kvs-value: 1.55

6.5.8 Return Temperature Limiter (RTB)

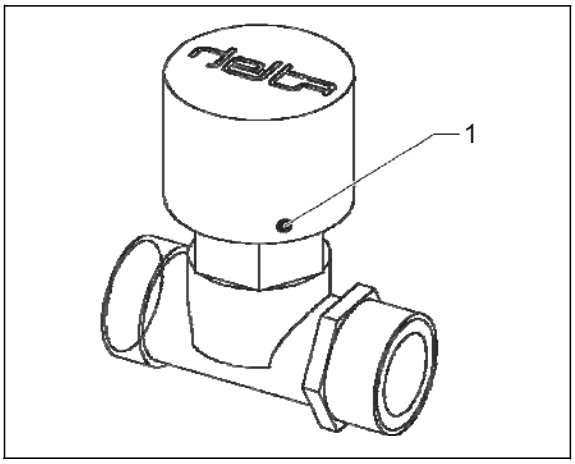


Fig. 6.12 Return temperature limiter

(1) 1.5mm Allen setscrew

The return temperature limiter protects and monitors the return temperature in the heating circuit. The RTB closes when the return temperature falls below the set value.

The valve has an adjustment scale, with the adjustment range imprinted on the cap. The cap can be tightened down with the setscrew. A sensor inserted directly in the valve body is responsible for temperature measurement. The setting is infinitely adjustable.

▶ Use the RTP to set the return temperature.

Remember:
The RTB does not set the hydraulic balance of the home heating circuit.

▶ Remember:

- kvs-value: 1.55
- recommended settings for static heating surfaces and two-pipe systems: 37.5 °C, if the heating surface correlates to 60/40 k.

6.5.9 Thermostatic Hot Water Regulator (TWR)

The thermal hot water regulator specifies an upper temperature limit. Most notably, this serves as protection against scalding. At the factory, the thermal hot water regulator is limited to a maximum of 60 °C, but its default setting is 55 °C (scale value 3). In this way, the hysteresis of the thermostat head is considered. The hot water temperature preset can be changed at the regulator and can be freely set under 60 °C.

▶ Refer to the corresponding values in the following table.

Scale values	1	2	3	4	5	6	7
Hot water temperature	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C

Follow these steps to change the preset:

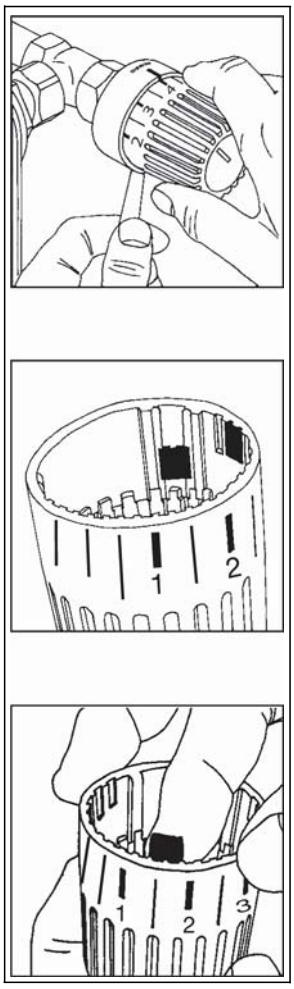


Fig. 6.13 **Change the thermostatic hot water regulator (TWR)**

1 Remove the thermostat head from the valve.

- ▶ Remember:
  The capillary lines are not to be kinked or broken.
- ▶ Use a welding rod to slide out the backing plate and set the value by moving the coupling nut left or right.
  If the valve head is only open to the top (the valve can be closed), then you only need to take out a backing plate.

2 Remove the top of the valve head.

- ▶ Lift out the internal anchor with a strong round object.

3 Install the handwheel.

- ▶ Align the white mark superimposed on the toothed sleeve with the white mark below the Oventrop lettering.
- ▶ Gently replace the handwheel at setting 5.
- ▶ Turn the handwheel from setting 5 to the desired setting.
  Example: For 50°C, turn to scale value 3.

4 Lock the setting.

- ▶ Set the clips behind the selected number on the handwheel.
- ▶ Replace the handwheel back to the setting value, so that the handwheel is locked to the new setting.

5 Install the thermostat head.

- ▶ Screw the valve head onto the valve.

▷ The preset is changed.

6.5.10Injection Circuit

To regulate the supply temperature of surface heating (floor heating), an injection circuit pump module may be installed in the Apartment unit. The injection circuit is delivered in one of two basic configurations:

- injection circuit with thermostatic supply temperature regulation (FPI)
- injection circuit with 3-point actuator without emergency function (EPI)

Injection Circuit with Thermostatic Supply Temperature Regulation (FPI)

The following overview illustrates the position of the components.

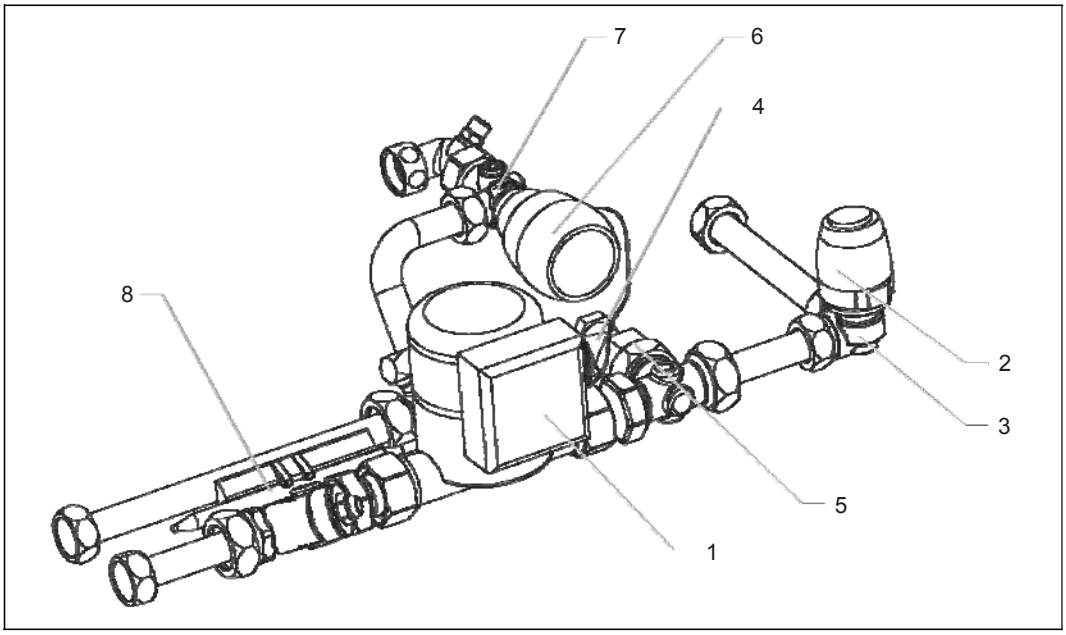


Fig. 6.14 Overview of an injection circuit with thermostatic supply temperature regulation (FPI)

(1) circulating pump
(2) actuator
(3) zone valve body
(4) regulator valve
(5) deposit backflow preventer
(6) thermostat head for temperature selection 20-50 °C
(7) valve for thermostat head
(8) contact sensor for thermostat head (diagram without insulation)

The bypass is completely open when delivered from the factory.

The deposit backflow preventer is installed in the bypass screw connection.

The commissioning and configuration of individual components is described in detail below.

1 Adjust the circulating pump.

One of the following pumps is installed in the injection circuit:

- Grundfos UPS 15-60
- ITT Lowara Laing Ecocirc 6

▶ Refer to the installation instructions from the pump manufacturer.

2 Adjust the zone valve.

The zone valve is used to set the heating volume flow on the primary side and is normally set to Kvs 0.62.

▶ When setting, refer to: (⇨ *Sec. 6.5.1 "Zone Valve"*).

The thermal actuator on the zone valve is an essential part of the security circuit for the floor heating circuit. The actuator is electrically wired to a safety monitor, along with the heating circuit pump.
BIF the maximum temperature is exceeded, the safety temperature monitor closes the actuator and switches off the heating circuit pump. As a result, the floor heating circuit is no longer supplied with heating energy, which means that the floor heating circuit is not damaged and health problems are avoided. Once the system has cooled back to the desired temperature, the pump is switched on again and the thermal actuator is opened again.

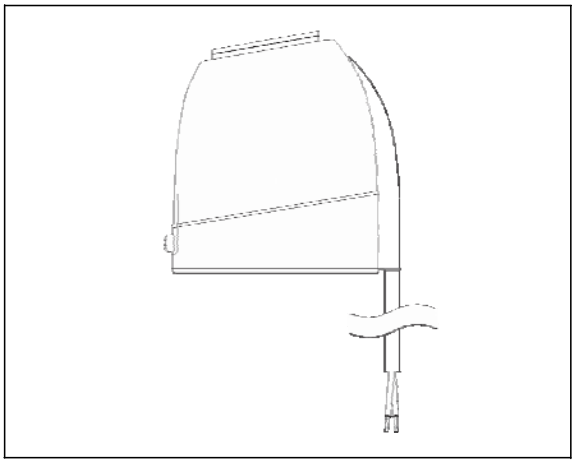


Fig. 6.15 Actuator electrical terminal

Operating voltage:	230V AC 50/60Hz
Operating efficiency:	2 W
Wiring:	2x0.75mm2 (1x blue/1x brown)

3 Adjust the valve body.

The control valve AZ is installed in the variable-flow section of the injection circuit. This has a kvs-value of 2.8.

Either the thermostat head or the 3-point actuator is installed on the control valve. An adjustment is not necessary.

4 Adjust the regulator valve.

If the supply temperature fluctuates too much, you must tighten the regulator valve. This requires that the primary volume flow is properly throttled through the zone valve (⇨*2 „Adjust the Zone Valve"*).

Settings:

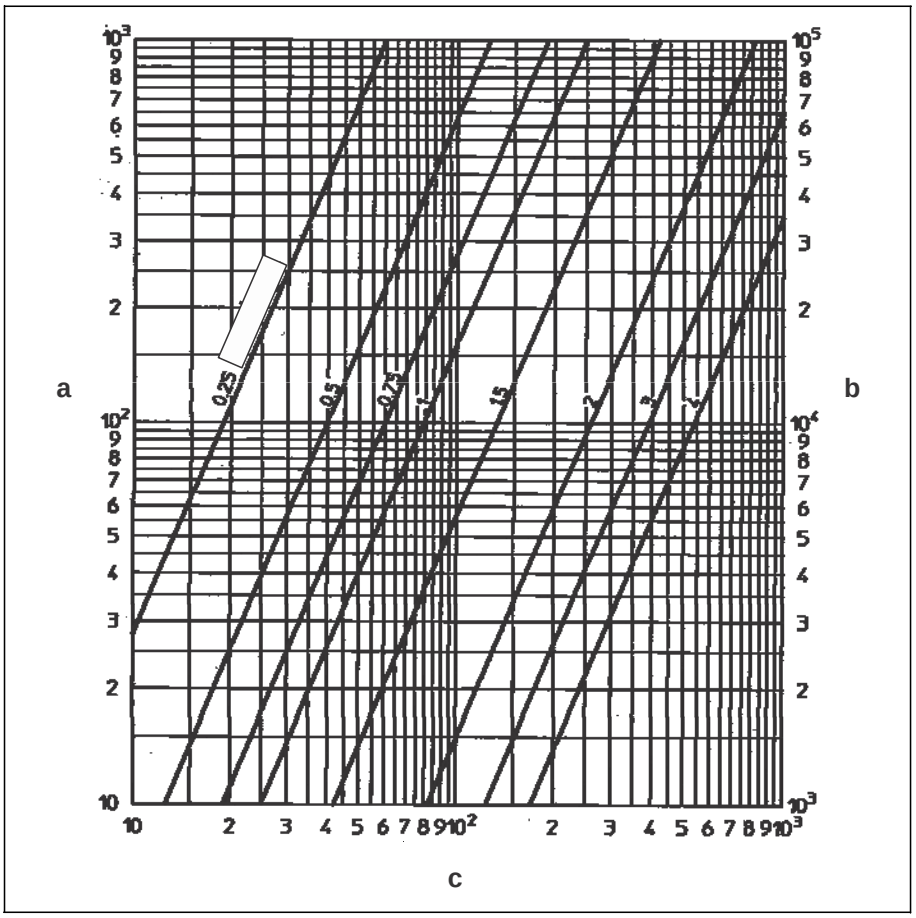


Fig. 6.16 Revolutions/pressure loss diagram

(a) pressure loss Δp [mbar]
(b) pressure loss Δp [Pascal]
(c) mass flow qm [kg/h]
(d) revolutions

Revolution	0.25	0.5	0.75	1	1.5	2	3	4
k_V-value	0.060	0.126	0.190	0.250	0.420	0.819	1.236	1.700
zeta-value (3/4")	93250	21150	9300	5370	1900	500	220	116

Follow these steps to change the preset:

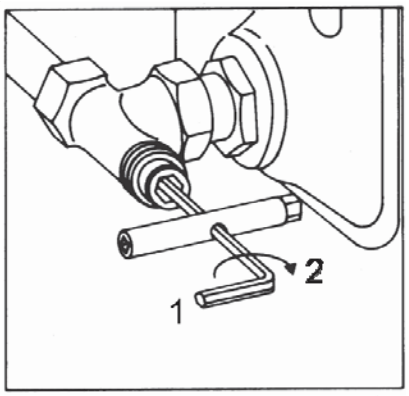


Fig. 6.17 Close the cone valve

(1) Allen wrench
(2) direction of rotation (close)

- ▶ Unscrew the protective cap.
- ▶ Use a 6 mm Allen wrench to close the cone valve (turn clockwise).
- ▶ Remember:
  The valve comes from the factory fully open.
  If the measured temperature regularly shows temperature fluctuations, you must throttle the bypass line. In this way, you can adjust the water and pressure proportions

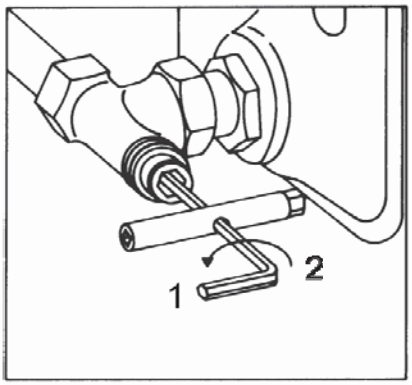


Fig. 6.18 Preset the cone valve

(1) Allen wrench
(2) direction of rotation (preset)

- ▶ Use a 6mm Allen wrench and turn counter-clockwise to set the cone valve.
- ▶ Refer to the revolutions listed in the table and diagram.
  (⇨ *Fig. 6.16*)
- ▶ Screw the protective cover back on.
- ▷ The preset is changed.

5 Set the check valve.

The check valve is used to prevent an accidental bypass and must not be adjusted.

6 Set the thermostat head.

The thermostat head is equipped with a remote sensor and regulates the supply temperature. The control range can be limited and locked.

- ▶ For settings, refer to the corresponding values in the following table.

Scale values	1	2	3	4	5	6	7
Control temperature (approx.)	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C

Injection Circuit with 3-Point Actuator without Emergency Function (EPI)

The following overview illustrates the position of the components.

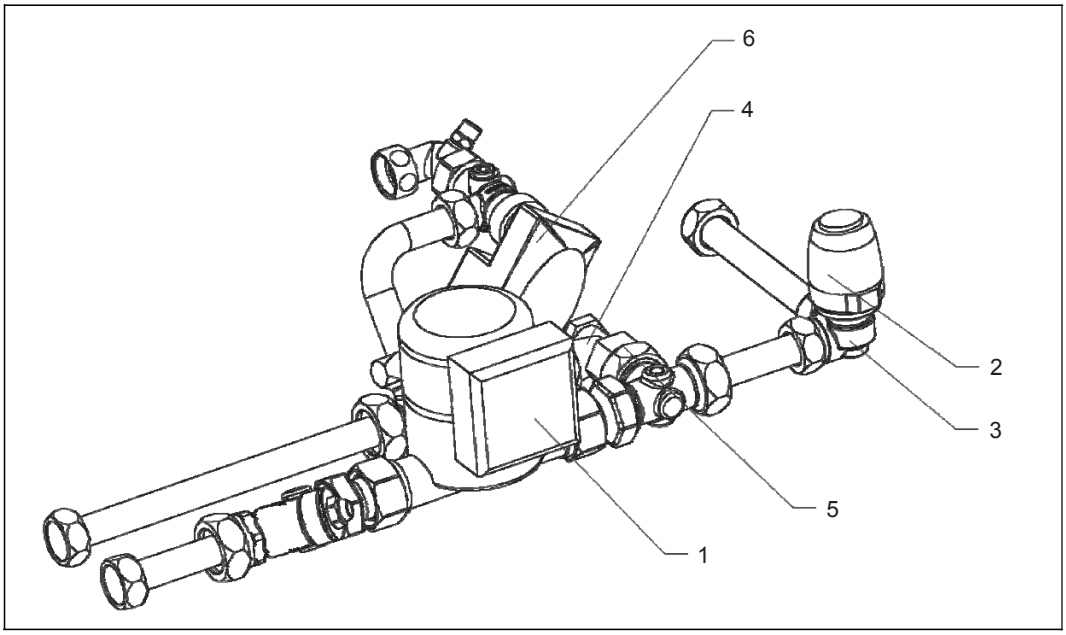


Fig. 6.19 Overview of injection circuit with 3-point actuator without emergency function (EPI)

(1) circulating pump
(2) actuator
(3) zone valve body
(4) regulator valve
(5) deposit backflow preventer
(6) 3-point actuator

The construction, operation, and settings of components for the EPI are identical to the injection circuit with thermostatic supply temperature regulation (FPI). The difference is in the temperature regulation.

In the injection circuit with 3-point actuator without emergency function, the temperature is regulated by an external regulator on the actuator. The required supply temperature sensor must be attached as a contact sensor at the on-site control of the constant volume circuit.

The actuator stem on the electric actuator is moved by applying voltage to Y1 or Y2 in the open or close direction. As soon as the voltage is shut off, the actuator pauses in the current position.

Also, the actuator has a power-dependent cut-off function in case of overload and in the stroke end positions.

Hand adjustment with a 3mm Allen wrench makes it makes it possible to set the actuator in any position.

If a control signal is received from the regulator, it overrides the position you set by hand. If you want to maintain the position that you set, you must either unplug the connection cable or switch off the operating voltage.

- During regulation, refer to the operating manual for the control unit.
- Remember the following points when assembling or installing the actuator.

The motorised actuators can be operated in any position except mounted vertically downward.

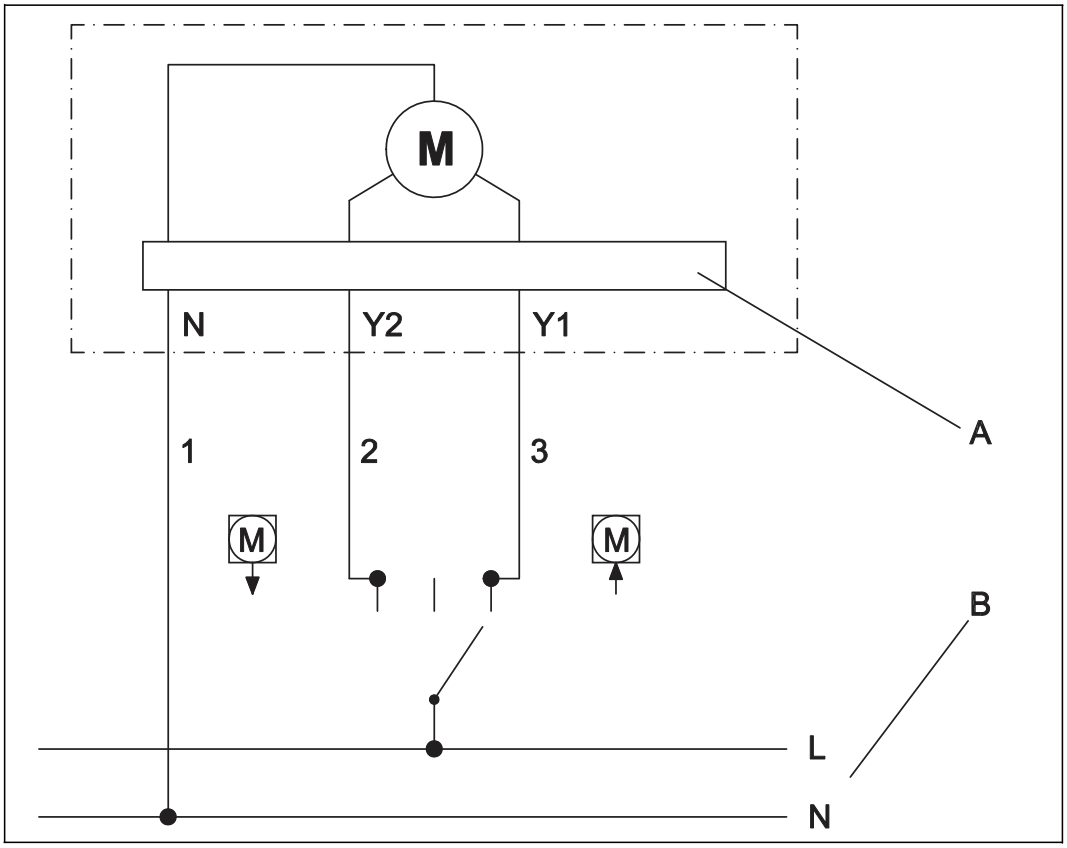


Fig. 6.20 Schematic connection for 3-position actuator

(1) blue
(2) white (actuator stem leads out)
(3) black (actuator stem leads in)
(A) electronics board
(B) 230 V AC

6.6 Fill Out the Acceptance (Commissioning) Certificate

The acceptance (commissioning) certificate is located in the appendix.

- Copy or print the acceptance (commissioning) certificate.
- Confirm the proper completion of the work with a checkmark ☑.
- Completely fill out the acceptance (commissioning) certificate.
- Give the completed and signed acceptance (commissioning) certificate to the operator.
- Fax a copy of the acceptance (commissioning) certificate to your dealer/trade partner.

6.7 Transfer the Device to the Operator

The operator of the heating system must be instructed on the operation and service of the Apartment unit. Proceed as follows:

- ▶ Give the operator all of the appropriate manuals, certificates, and device papers for safekeeping.
- ▶ Notify the operator that the manuals, certificates, and device papers are to be stored near the device.
- ▶ Notify the operator of the settings on the control devices.
- ▶ Inform the operator of the adjusted and recorded values.
- ▶ Be sure to point out the safety notices to the operator.
- ▶ Notify the operator of the necessity of regular maintenance of the system.

▷ The device has been placed into service and can now be used to its full extent.

7 Service

7.1 Service the Apartment unit

With normal usage, the Apartment unit regulates and maintains the attached circuits without interference.

It is not possible for the user to adjust the hot water temperature. This is set by the central heating system.

Regulation of the heating temperature is possible through the control devices outside the

Apartment unit.

- ▶ Refer to the service manual for the control device.
- ▶ Refer to the notices for shutting off the system during troubleshooting or longer absences (⇨ *Sec. 10 "Decommissioning"*).

7.2 Information Regarding Energy Conservation

- ▶ Refer to the following information regarding energy conservation.

Hot water preparation only occurs as required. Service water is not stored. This is one of the most convenient methods of preparing domestic hot water. The Apartment unit allows you to draw as much hot water as you want. The only restrictions are those imposed by the central heating system. The heating lines are always kept at a base temperature. This is usually 45°C.

In order to operate the complete system economically, the base temperature should not be set any higher. After a long pause, a short delay to reach the maximum hot water temperature is normal. Thermal heat is available at the Apartment unit year-round. You can always use the home heating, if necessary.

8 Troubleshooting

8.1 Recognizing and Correcting Errors

The following overview helps you to identify possible errors and their causes and to take steps to correct the errors.

If you cannot troubleshoot an error, you should contact customer service. (⇨ *Sec. 12.2 "Customer Service"*).

Issue	Cause/Description	Action
1. **The home heating does not work.**	Supply temperature too low.	- Raise the supply temperature at the heat source - Check the buffer loading
	No or insufficient flow rate at the device	- Review the settings at the device fittings Note: the volume must conform to the design - Clean the dirt trap in the primary supply and the secondary return - Check the heat meter model. Note: must be QN 1.5 with minimal pressure loss - Check the pump settings for the central heating pump Recommendation: set to constant volume flow rate - Check the settings on the zone valve - Open the shut-off valve - Verify the settings and technical parameters for the differential pressure regulator in the line
	Air in the device.	- Use the manual vent valve to bleed air from the device Note: This is only intended for the device. - Bleed the home heating circuit in the provided locations. - Bleed the main line - Upgrade the central vent on the heat source - Bleed the buffer
	Mixed cycle for floor-heating.	- Review the settings at the regulator or thermostat head - Open or close the bypass line on the regulator screw connection - Review the pump settings - Check the settings at the distributor - Clean the dirt trap on the secondary side

Issue	Cause/Description	Action
2. **The hot water does not work.**	Wait times too long for hot water	- Check and raise the temperature settings at the TTV - Upgrade the TTV on the device - Update the service water circulation - Check the pump settings for the central heating pump Recommendation: set to constant volume flow rate
	PM valve is leaking	- Replace the PM valve
	PM valve is jammed	- Replace the PM valve
	Too little hot water, or temperature is too low	- Raise the supply temperature at the heat source - Check the buffer loading - Review the settings at the device fittings - Clean the dirt trap in the primary supply and in the cold water inlet - Check the heat meter model. Note: must be QN 1.5 with minimal pressure loss - Check the pump settings for the central heating pump Recommendation: set to constant volume flow rate - Verify the settings and technical parameters for the differential pressure regulator in the line - Verify the size of the cold water opening and enlarge, if necessary

9 Maintenance

DANGER!

Risk of death due to electrical shock!

Controllers and pumps are connected to electrical current. Contact with components that carry electrical current
can lead to risk of death.

- ▶ Switch off the power before beginning work on electrical components.
- ▶ All work on electrical components is only to be performed by qualified electricians.
- ▶ Never allow wet or damp body parts to touch electrical components.
- ▶ Never pull on electrical wires or connections.

CAUTION!

Environmental damage from escaping liquid!

When you disconnect the connectors, liquid can flow uncontrolled into the open and damage the environment.

- ▶ Be sure that any fluids are collected properly.
- ▶ Use proper containers for collection and transport.

Maintenance keeps the device ready for operation and helps to avoid premature wear. Maintenance can be divided into the following categories:

- service
- upkeep
- repair

9.1 Service

DANGER!

Risk of death due to improper work!

Technical expertise is required for safe work on the Apartment unit.

- ▶ Do not perform this maintenance work unless you are authorised to do so and have the required expertise.

CAUTION!

Possible property damage due to neglected or improper service!

Service interruptions can arise if the Apartment unit does not undergo annual maintenance.

- ▶ The specified service work should be performed professionally according to the service log and the warranty conditions.

The Apartment unit is generally service-free. Regular replacement of components to keep the Apartment unit in operation is not required.

The lifespan of the heat exchanger and the Apartment unit depends upon the operational mode
and the quality of the heating water and drinking water.

Observe the following in order to keep the heating system and the Apartment unit in proper working order:

- ▶ Perform the specified service work annually according to the service log.
- ▶ Record the properly completed service in the service log.
- ▶ Whenever defects are found, repair them immediately.

You must perform the following service work at the Apartment unit:

1. Perform visual inspection and leak test
2. Check electrical connections
3. Verify operation and check the Apartment unit's parameters and settings
4. Fill out the service log

The service work is described in detail below.

9.1.1 Perform Visual Inspection and Leak Test

▶ Check all components and piping for possible leaks.

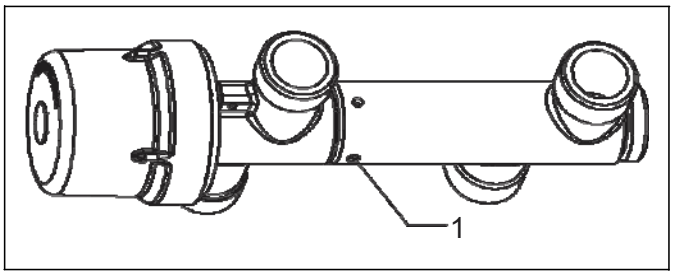


Fig. 9.1 PM valve

(1) Leakage borehole

Water escaping from the leakage borehole indicates leakage from the sanitary facilities or the heat area of the PM valve. These are separate, discrete cells so that their contents cannot be mixed inside the PM valve.

▶ Check the PM valve and the heat exchanger for possible leaks or deformation.

▶ If you find leaks, replace the seal or, if necessary, the leaking components.

▶ Replace any leaking PM valves or deformed heat exchangers.

9.1.2 Check Electrical Connections

▶ Check all plug-in connections and lines to be sure that they are firmly seated and not damaged.

▶ Properly repair any defective electrical connections.

9.1.3 Verify Operation and Check the Apartment unit's Parameters and Settings

▶ Copy or print out the *„Service Log"* from the appendix. (⇨ *Sec. 14 "Appendix"*)

▶ Verify the operation according to the *„Service Log"* found in the appendix.

▶ Use a checkmark ☑to confirm that the operation was successfully verified.

▶ List any values that you read.

▶ Compare all parameters and settings with the values obtained during commissioning.

▶ If necessary, optimise the settings after consulting with the operator.

9.1.4 Fill Out the Service Log

You must record any steps that you completed.

- Copy or print out the *„Service Log"* from the appendix. (⇨ *Sec. 14 "Appendix"*)
- Perform the steps and fill out the service log.
- Archive the completed service log.
- Give the completed service log to the controller.

If a service call is required, the service log is required for a warranty claim.

9.2 Upkeep

The Apartment unit does not require any special upkeep. You can remove dust or deposits, if necessary.

- Do not use any scrubbing or cleaning agents, which can damage the surface or casing of the unit.

9.3 Repair

DANGER!

Risk of death due to improper work!

Technical expertise is required for safe work on the Apartment unit.

- Repair work should only be performed by authorised personnel possessing the required expertise

Repair work may include exchanging or repairing components and is only necessary if components have been damaged due to external circumstances.

Regarding repair work:

- Do not repair any damaged or worn out components, but rather replace the entire part.
- Only use genuine replacement parts.
- Whenever you remove a gasket, always replace it with a new gasket.
- Always perform any necessary repair work properly, according to the state of the art and in compliance with any applicable regulations.

10 Decommissioning

DANGER!

Risk of death due to electrical shock!

Controllers and pumps are connected to electrical current. Contact with components that carry electrical current can lead to risk of death.

- Switch off the power before beginning work on electrical components.
- All work on electrical components is only to be performed by qualified electricians.
- Never allow wet or damp body parts to touch electrical components.
- Never pull on electrical wires or connections.

CAUTION!

Environmental damage from escaping liquid!

When you disconnect the connectors, liquid can flow uncontrolled into the open and damage the environment.

- Be sure that any fluids are collected properly.
- Use proper containers for collection and transport.

CAUTION!

Property damage to the heating system!

Improper commissioning can cause damage to the entire system.

- Decommissioning should only be performed by authorised personnel possessing the required expertise.

10.1 Taking the Apartment unit Out of Service Temporarily

During normal operation, the operator may not take the Apartment unit temporarily out of service. An authorised technician may take the Apartment unit out of service temporarily for service work. Complete the following steps:

- Properly disconnect the device from the power supply.

For extended absences (more than three days):

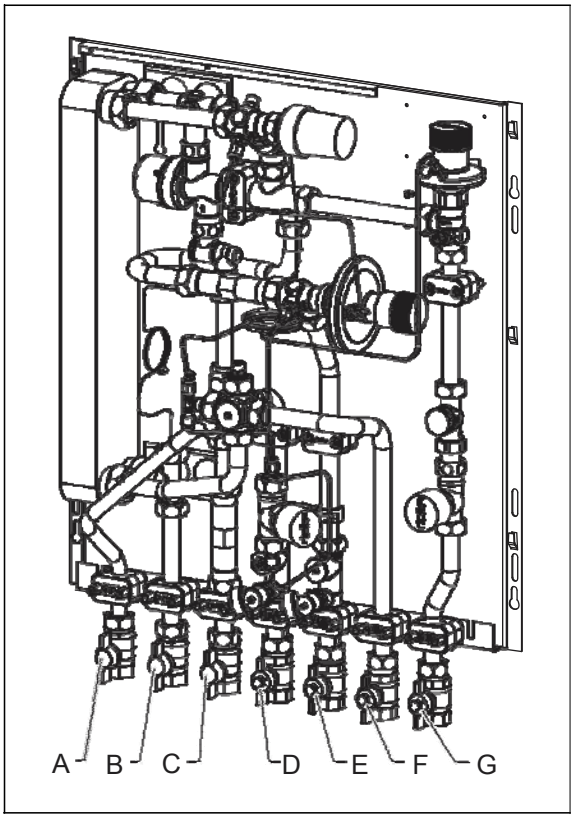


Fig. 10.1 Apartment unit valves (WK wide) - (schematic diagram)

(A) Cold water to home (optional)
(B) Hot water
(C) Cold water supply line
(D) Hot water supply from the central heating system
(E) Hot water return from the central heating system
(F) Heating supply for the home
(G) Heating return for the home

- Shut off the cold water line (valve C in example).
- Open the remaining ball valves.
- Set the frost protection function at the heating controller.

Follow these steps to put the unit back into service:

- Turn off the frost protection function at the heating controller.
- Open the cold water line (valve C in example).
- Let the hot water run for approximately five minutes.

10.2 Taking the Apartment unit Out of Service Permanently

At the end of its service life, the operator may not automatically take the Apartment unit out of service. Only an authorised technician may decommission the unit.

To take the device out of service permanently, follow these steps:

1 Disconnect the Apartment unit from the power mains.

- ▶ Properly disconnect the device from the power supply.

2 Uninstall the electrical connections.

- ▶ Remove the cables from all connections.

3 Remove the device.

- ▶ Close the shut-off valve for the device.
- ▶ Drain any remaining heating water.
- ▶ Loosen the connection nut on the shut-off valve.
- ▶ Remove the device.

4 Dispose of the Apartment unit.

- ▶ Arrange for proper disposal of the Apartment unit. (⇨ *Sec. 11 "Disposal and Recycling"*).

11 Disposal and Recycling

11.1 Dispose of Packaging Material

The packaging material is fully recyclable and can be disposed of in an environmentally-friendly manner. Disposal of the packaging material is the responsibility of technician.

- Be sure that the packaging material is disposed of properly.
- Dispose of the packaging material at a designated public collection facility.
- Observe any national or local regulations for disposal.

11.2 Dispose of the Device

At the end of its service life, the device is not to be placed in household waste, but rather it must be taken out of service and disposed of properly.

The device contains electrical and hydraulic components that must be disposed of separately.

- Arrange for proper and environmentally-friendly disposal.
- Take the device to a designated public collection facility for disposal.
- Observe any national or local regulations for disposal.

12 Customer Service Information

12.1 Warranty

Warranty and liability claims for personal or property damage are excluded if they result from one or more of the following conditions:

- Improper use of the device.
- Improper installation, commissioning, operation, or maintenance of the device.
- Operating the device with defective safety devices or improperly attached or inoperable safety or protection measures.
- Disregarding the information in the service manual with regards to transport, storage, installation, commission, operation or maintenance of the device.
- Unauthorised structural changes to the device beyond the purpose for which it was intended.
- Inadequate monitoring of parts that are subject to wear.
- Improperly performed repairs, inspections or maintenance.
- Disasters caused by foreign bodies or acts of God.

12.2 Customer Service

You can reach Customer Service through your designated contact at KaMo Frischwarmwassersysteme GmbH.

KaMo Frischwarmwassersysteme GmbH

Max-Planck-Straße 11
89584 Ehingen

Deutschland

Tel.: +49 (7391) 7007-0

Email: technik-fws@kamo.de

www.kamo.de

12.3 Replacement Parts

Should the Apartment unit require service or maintenance work, only genuine replacement parts may be used.

Contact Customer Service to order replacement parts. Information on replacement parts is located in the product information.

13 Technical Data

13. Specifications

The illustration shown is a schematic diagram and does not represent every possible configuration. All information is subject to change. Apartment units that are not listed below are located in the product configuration.

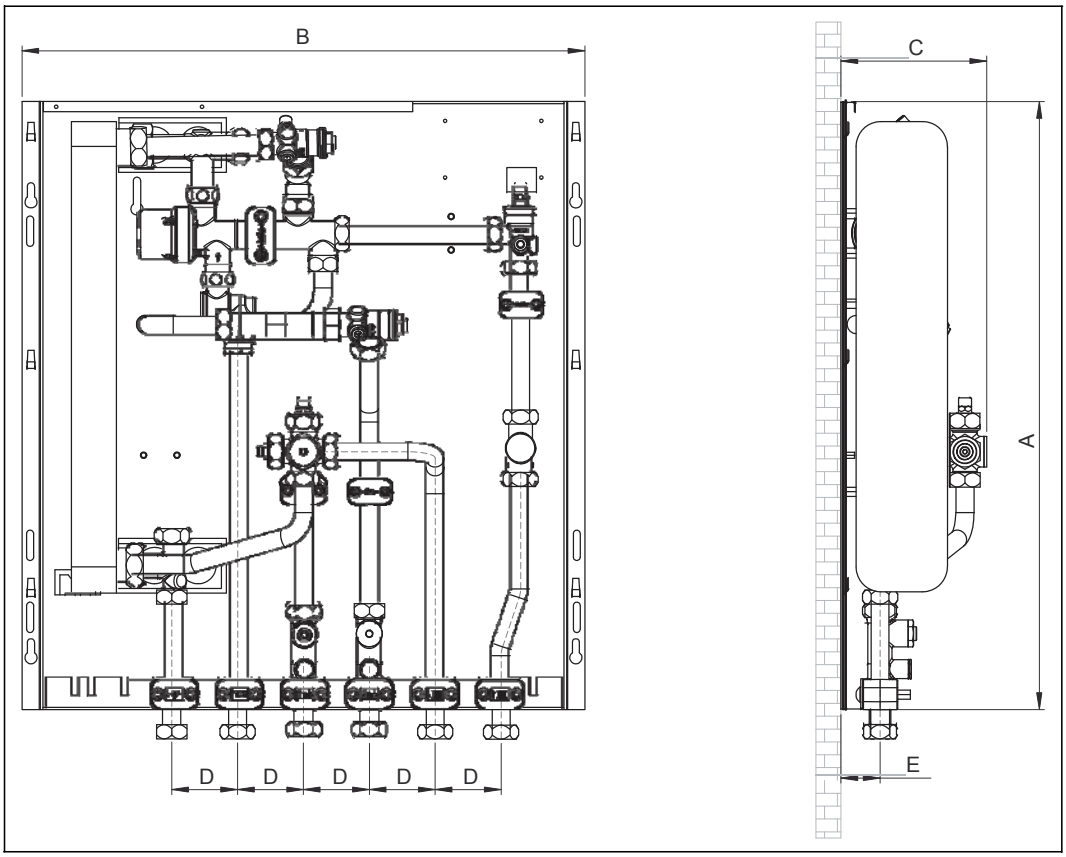


Fig. 13.1 Apartment unit dimensions (schematic diagram)

Device	Height (A)	Width (B)	Depth (C)	Pipe spacing between connectors (D)	Distance (E)	Weight (approx.)
1022458 Basic unit WK wide WP24-30	600 mm	555,5 mm	145 mm	65 mm	38.5 mm	15.28 kg
1022459 Basic unit WK wide WP24-40	600 mm	555,5 mm	145 mm	65 mm	38.5 mm	16.74 kg

Device	Height (A)	Width (B)	Depth (C)	Pipe spacing between connectors (D)	Distance (E)	Weight (approx.)
1022458 Basic unit WK wide WP24-30	600 mm	555.5 mm	145 mm	65 mm	38.5 mm	15.28 kg
1022459 Basic unit WK wide WP24-40	600 mm	555.5 mm	145 mm	65 mm	38.5 mm	16.74 kg
1022460 Basic unit WK slim WP24-14	600 mm	435.5 mm	145 mm	50 mm	38.5 mm	12.89 kg
1022461 Basic unit WK narrow wp24-20	600 mm	435.5 mm	145 mm	50 mm	38.5 mm	15.02 kg
1022462 Basic unit WK slim WP24-30	600 mm	435.5 mm	145 mm	50 mm	38.5 mm	16.48 kg

13.2 Overview of Technical Data

All information is subject to change. Apartment units that are not listed below are located in the product configuration.

Materials	
Fittings:	Brass/dezincification-resistant brass
Piping:	Stainless steel 1.4401
Heat exchanger:	Stainless steel 1.4401/soldered copper and nickel

General	
Max. operating temperature:	90 °C
Operating pressure:	PN10
Minimum cold water pressure:	ca. 2 bar
Connections:	¾" female thread flat-sealing

Differential pressure regulator (DDR)	
Max. operating pressure:	16 bar (PN 16)
Max. differential pressure:	1.5 bar
Max. operating pressure:	120 °C
Capillary tube length:	1 m
Threaded connector:	M30 x 1.5

Thermostatic temperature holding module (TTV)	
Max. operating pressure heating:	10 bar (PN 10)
Hysteresis:	+/- 2-3K
Kvs-value:	1.5
Threaded connector:	2 x 3/4” male thread - conical with cone crossings

Return temperature limiter (RTB)	
Max. operating pressure heating:	10 bar (PN 10)
Operating temperature heating (factory set):	39 °C
Hysteresis:	+/- 2-3K
Kvs-value:	1.5

Servo motor for injection circuit with 3-point actuator without emergency function	
Operating voltage:	230 V AC, +/- 15%
Power consumption:	6 VA
Control:	3-point, reversible
Parallel operation:	max. 6 motors
Max. stroke:	5.5 mm
Actuating power:	> 90 N
Actuating time:	ca. 60 s/mm
Protection class:	IP 40 according to EN 60529
Protection category:	II according EN 60730
Medium temperature:	max. +110 °C
Ambient temperature:	+1...+50 °C, non-condensing
Storage temperature:	-5...+50 °C, non-condensing
Transport temperature:	-25...+70 °C, non-condensing
Power supply cable:	3-core cable, length 1.5 m

14 Appendix

The appendix contains models of the following documents to be copied or printed out:

1. Acceptance (commissioning) certificate for the Apartment unit
2. Service log

ACCEPTANCE (COMMISSIONING) CERTIFICATE FOR THE APARTMENT UNIT

Apartment unit

Customer	Name, Address, Telephone, Email
Workshop:	Name, Address, Telephone, Email
Put into service by:	Name

Property:	Living space, approx. ca.: ..... m^2 ; Heating requirement approx..: ..... kW
Product:	Model: Apartment unit Art. No.: ..... Serial number .....

Commissioning Steps	**Completed**
Inspect the device before commissioning	☐
Flush the system	☐
Fill the system	☐
Bleed the system	☐
Verify the settings	☐
Fill out the acceptance (commissioning) certificate	☐

Heating circuits: ☐ Radiator ☐ Floor ☐ Hydraulically balanced

Values:	Supply temp.: .... °C Return temp.: .... °C (for both circuits radiator and floor heating)	RTB setting: ....
	Hot water temperature: ....°C	TWR setting: ....
	Hot water volume: .... l/min	Thermal regulator value for the floor circuit: ....
	Primary volume flow for hot water preparation:	Zone valve Kvs-value in home heating circuit: ....
	DDR setting:	Zone valve Kvs-value in static circuit: ....
	TTV setting:	

Comments/stipulations:

The device was properly commissioned.

In-service date: Customer/operator signature: Technician signature:

SERVICE LOG

Customer:	Name, Address, Telephone, Email
Service company:	Name, Address, Telephone, Email
Serviced by:	Name
Product:	Model: Apartment unit Art. No.: ..... Serial number .....

Service Work		**Interval**	**Completed**
1.Visual inspection and leak test		annual	☐
2.Visual inspection of electrical connections		annual	☐
3.Verify operation and check the Apartment unit's parameters and settings:			
a) Check the dirt trap in: (refer to the appropriate hydraulic diagram in the product configuration)	- the cold water inlet - the primary supply - the secondary heating circuit	annual	☐
b) Check the PM valve:	- for leaks - for operation, after a test draw of hot water, the heat exchanger must cool off significantly (Note: not when using a service water circulation.)	annual	☐
c) Check the heat exchanger	- for leaks - cover plates free of damage	annual	☐
d) Check shut-off valves	- to be sure that they operate easily	annual	☐
e) Check the TTV	- Test whether the TTV closes at the target temperature	annual	☐
f) Verify the settings according to the commissioning certificate (mark where affected): Varies from commissioning values: yes/no:		annual	☐

Comments/stipulations:

The service was properly completed.

Service date: Customer/operator signature: Technician signature

Service Manual - Installation, Commissioning, Service and Maintenance
For the Technician
Apartment unit
Version: 11/2011